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Railway Age

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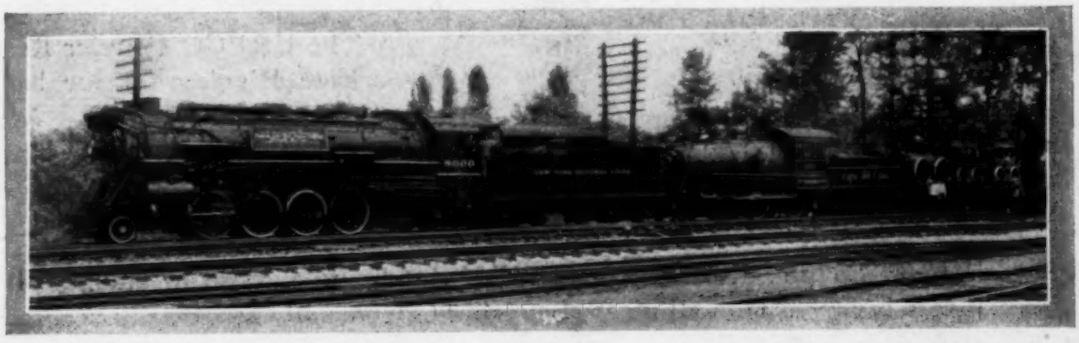

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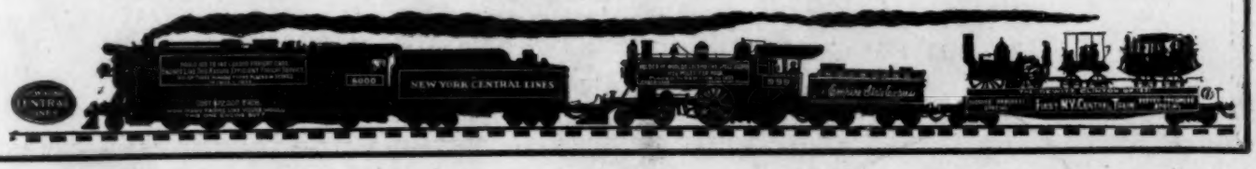

Alphabetical Index to Advertisements, Page 76 Classified Directory of Advertisers, Page 72

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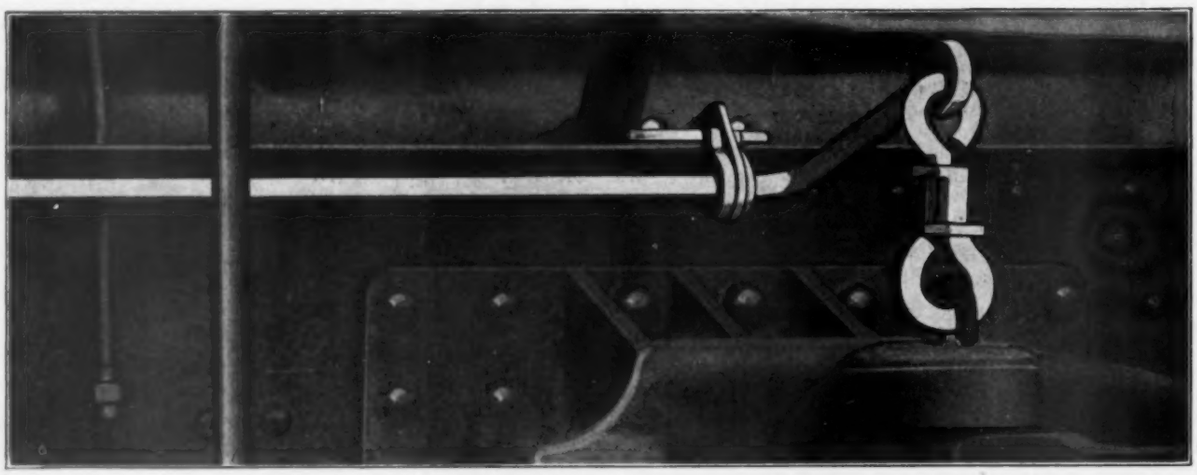

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EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Longer Rails in Highway Crossings

National programs for improved highways have brought about correlated improvements in the roadways provided across tracks where the railways are intersected by the highways at grade. Better construction generally means greater first cost, which can be justified only if the improved construction is insured a reasonable service life. In general, therefore, the types of crossings applied have been such as are able to withstand the wear and tear of the highway traffic for a number of years. However, to accomplish this end the construction has usually taken a form which is not so easily removed from the tracks as the ordinary plank crossing. Therefore, the normal service life of the pavement or roadway construction cannot be obtained unless the track has been put in condition to retain good line and surface for a number of years without having any work done on it which requires the removal of the crossing. With efficient drainage, good ballast, sound ties, relatively new rail and a normal relation of traffic to track construction, it has been possible to leave the tracks under these roadway pavements undisturbed for approximately five years, providing no rail joints fall within the limits of the crossing construction. The ties under joints necessarily need attention within this interval of time. For this reason it is common practice to cut rails so that the joints will fall outside of the roadway, and for roadways of more than ordinary width some railroads have provided rails longer than 33 ft. to accomplish this same end. These longer rails are readily obtained, and their general use in place of the 33-ft. standard is being actively promoted. However, pending a concerted movement in this direction it would seem that for special service as in highway crossings, the saving in maintenance expenditures to be effected by their use will easily offset any added cost of the rail and should justify their purchase for this purpose wherever required.

Improved Locomotive Statistics

The many figures compiled by the Car Service Division and made public through various channels offer continuing interest to those who profess a liking for statistics—railway or other. Probably the most important reason for this is the wide use which has been made of the figures and particularly the readiness with which analysts of business conditions and like observers outside the railway field have used them in their own work. The *Railway Age* has on several occasions pointed out that the data are, in the last analysis, intended to serve the purpose of determining the proper allocation of railway freight cars. That the business analysts have been able to take the compilations and totals prepared for such a definite purpose and give them a broad use in determining the situation in other lines of industry is unquestionably a tribute of no little weight to the units which have been selected by the Car Service Division statisticians. The result follows primarily from the adequacy of the units themselves as used in their varied purposes and particularly from the promptness with which the figures are made available. This is especially the case with the car loadings figure, which is a very adequate figure for determining the volume of industrial activity and is by-and-large the first unit giving any indication to that effect which is made available from any statistical source. Another cause for the interest of the statistician in the statistical work of the Car Service Division is the frequency with which those in charge of the division's statistical work have introduced new statistical units or new methods of compilation. Of course, statisticians are usually not eager to have new figures or new methods of compilation foisted upon them which follows principally because of the lack of comparability which is frequently introduced as between the new and the former figures. The Car Service Division happily seems to have been able to avoid difficulties along this line. Its new units represent real progress and the readiness with which new methods have received attention and adoption will not pass unnoticed. The last step, by way of progress, is the introduction of the new locomotive equipment condition report, Form CS-56, which henceforth will show locomotives held for repairs separated by the class of repairs for which they are held and which similarly will show the total of locomotives repaired segregated also by classes. The new report will offer to the user of the figures an even more adequate check than in the former figures as to the locomotive maintenance situation, as to the activity of the mechanical department and also as to the adequacy of equipment maintenance expenses generally and should prove of great usefulness.

Barge Line Makes Poor Showing

Based on the results of the Mississippi-Warrior Service, the operation of a barge line on the Mississippi river by private interests would inevitably meet with failure. As shown in an article in this issue, the barge line operated by the federal government on the Mississippi and Warrior rivers, while steadily developing the facilities and traffic of its lines, has nevertheless failed to earn its expenses in all but one of the five years it has been operated. Its total net losses during its existence have amounted to $2,036,608.17, while the net loss during the past year alone was $624,796.62. The record of the Warrior river section has been one of consistent deficits and there is little likelihood of improvement. While it is true that the line would have earned a net profit last year if it had not been for a long period of low water in the Mississippi river, which might be construed as evidence of the possibilities of the line to operate profitably under favorable conditions, the record of the service has developed sufficient drawbacks in river transportation to prove the improbability of successful private operation. The service was established by the government as an experiment to determine the practicability of the operation of such a line with the intention that as soon as such practicability had been demonstrated the line would be turned over to private

enterprise. The entire plant was furnished by the government without any cost whatsoever to the service, either in initial capital outlay or in the payment of interest charges. According to those in charge of the present line, there are five conditions precedent to success. These are a suitable, navigable waterway; suitably designed equipment; suitable terminals and balanced traffic in both directions; interchange of freight with railroads, and equitable divisions of revenues accruing to both water and rail transportation for combined hauls. These requirements have been met to a great extent, except during the past year when the condition of the river nullified the factors which might have brought success. Yet the government-owned line, with all its advantages, has proved a heavy liability. The primary inducement to shippers which the barge line has offered has been a schedule of freight rates approximately 20 per cent below the corresponding rail rates on all commodities carried. This inducement has proved successful in filling the barges to their capacity during most of the year, but of course has had a corresponding effect on the gross earnings of the line. It is interesting to note, however, that even if the rates charged by the barge line had been equal to those of the corresponding rail tariffs, the earnings would not have been sufficient to pay expenses. The total freight revenue of the Mississippi section during its entire period of operation has amounted to $6,371,699.13. If the barge line's rates had been equal to the rail rates, the revenue on the freight transported would have amounted to $7,964,623.90. The total operating expenses have been $8,473,854.42, so that even with revenues computed at full rail rates, an operating deficit of more than a half million dollars would have been incurred. With its advantages, it is possible that the government-owned line might earn its expenses under favorable river conditions. It is obvious, however, that it would be extremely difficult, if not impossible, for such an enterprise, privately owned, to overcome the handicaps of heavy cost of sufficient equipment and terminals, with resulting interest charges, and the obstacle of uncertain operations and traffic due to the river conditions.

Locomotive Lay-Over Points

The difficulty in financing railway improvements in recent years has not only retarded the development of engine terminals to take care of large and heavy locomotive power but in some cases has prevented the building of any enginehouse facilities whatever at points where locomotives must tie up over-night. Definite illustrations of this condition are not hard to find. In one case the report submitted to a superintendent of motive power by one of his men regarding conditions at a certain terminal indicated that five switch engines tie up at this point every night. A stretch of the imagination is required to call this point a terminal for no locomotive housing facilities whatever are provided, nor is there any cinder pit or adequate provision for taking care of the ashes. A derrick and air hoist deliver coal to the tender, air for the hoist being supplied by the locomotive. Twelve men and three hostlers are employed. The switch engines are held on the track leading to the coal dock, and must be moved whenever a road engine comes to this point for coal. The report states that if an enginehouse, turntable and adequate means for handling cinders and coal were installed seven men could handle the work which now require fifteen. Besides the labor-saving there would be a saving of at least one and a quarter tons of coal, now required to be burned in each locomotive every night to keep it from freezing. These are the kind of terminal conditions which need attention at the present time and correction.

La Follette Proposes Pre-War Rates on Farm Products

THE RECKLESS DISREGARD of facts and consequences which is shown by radical public men in attempts to destroy the earning capacity of the railways is again afforded striking illustration by a bill which Senator LaFollette of Wisconsin has introduced in Congress and by the reasons he gave for introducing it. The bill takes the form of a joint resolution giving specific and binding instructions to the Interstate Commerce Commission to restore freight rates on all farm products to the pre-war basis.

In introducing his bill Senator LaFollette said: "The price of wheat and other farm products has decreased to pre-war levels." This statement is untrue and Senator LaFollette, being an intelligent man, must have known it was untrue. The Bureau of Labor Statistics of the United States Department of Labor publishes statistics monthly showing the average wholesale prices of commodities. The latest bulletin of the bureau upon this subject shows that in December, 1923, the average wholesale price of farm products was 45 per cent higher than in 1913, the prices for which year it uses as its pre-war base. Other statistics of the same authority show that the farm prices of cattle and hogs were less than the pre-war prices, while the prices of the following farm products were the following percentages higher than the pre-war prices: Wheat, 17 per cent; corn, 18 per cent; potatoes, 38 per cent; cotton, 158 per cent; cottonseed, 111 per cent; lambs, 86 per cent. They also show that tobacco, a farm product, was selling in the Louisville market for 112 per cent more than in 1913; and that wool, another farm product, was selling in the Boston market for 92 per cent more than the pre-war price.

Senator LaFollette in his bill makes no discrimination, however, between different farm products. Cotton sold in 1913 for 11 cents a pound and recently has been 35 cents a pound, but he proposes to make relatively as large a reduction in the freight rates upon it as upon wheat. The facts show that whatever may be the situation of other farmers, the producers of cotton, cottonseed, tobacco, lambs and wool do not need a reduction in their freight rates or in the cost of anything else that they have to buy. The fact that Senator LaFollette includes them in his proposed reductions of rates is sufficient proof that he is not trying merely to aid in giving relief to farmers who are in trouble because of low prices, but that he is engaged in playing his old political game of attacking the railways for his own special purposes.

The adoption of this proposed legislation would surely accomplish his purpose of doing great damage to the railways. The proposed reduction of rates would amount to about $40,000,000 on the railways in southern territory, $140,000,000 on the railways in eastern territory and $150,000,000 on the railways in western territory, a total of about $330,000,000. All of this necessarily would come out of net operating income. Since the net operating income of the railways as a whole is at the present time running at the rate of approximately $990,000,000 a year, the reduction of it would be about 33⅓ per cent. The net operating income earned by the western roads in 1923 was about $380,000,000, or 4.56 per cent on their valuation. The effect of this legislation would be to reduce it to about $230,000,000, or to less than 2.7 per cent on their valuation.

It is doubtful if on this basis a single railway in western territory would be able to earn enough operating income to pay the interest on its bonds. It is certain that practically all of them would very speedily be thrown into bankruptcy.

It would appear that the radical statesmen are engaged in intense competition to see which of them can create the most political capital for himself by making reckless and

misleading statements regarding railway matters and introducing bills the effect of whose adoption would financially ruin the railways and incidentally precipitate a panic which would destroy the prosperity of the country. There was a time when Senator Brookhart of Iowa was ahead in this race. Senator LaFollette has now caught up and passed him by at least a length.

Meantime, the railways are to be congratulated upon the enemies they have made. Such bills as this latest one of Senator LaFollette's are so obviously reckless and insincere that they can hardly fail to discredit those who introduce them in the eyes even of their most completely misguided followers.

How About the Centennial Movement?

IT IS NOW considerably more than a year since a railroad centennial celebration was first suggested. It is almost a year—last March, to be exact—since the American Railway Engineering Association passed a resolution advocating that the centennial be observed. It is ten months since the American Railway Development Association did likewise, and eight months have elapsed since the Mechanical division of the American Railway Association also endorsed the suggestion.

It is now considerably less than five years until this anniversary period. The resolutions mentioned have aroused widespread interest in railway circles, and outside as well. Several references to the subject have appeared at various times in the daily press and other publications. At the present time, however, it must be confessed that the railway centennial is but a suggestion. To make it a definite project there must be recognition and backing by proper authority. It is to be hoped that this official sanction will be given soon.

It appears that the progress of this movement has been impeded by the indecision associated with various questions which have arisen in centennial discussions. Prominent among these questions are: What specifically is it proposed to celebrate? When is it proposed to celebrate? How and where?

The first question presents a point which should not be difficult to settle. The resolutions, already referred to, of themselves, leave no doubt as to what all three associations proposed. It is a centennial of American railroads.

The second question is more involved. The resolutions are non-committal. The suggestions are numerous. It has been urged that 1925 is the proper year for the centennial, when it is planned to observe in England the one-hundredth anniversary of the opening of the Stockton & Darlington, the first railway in the world equipped for a "promiscuous" traffic and upon which, in 1829, the famous trial of Stephenson's Rocket was made. It has been advocated that the centennial should be held in 1926, in conjunction with the semi-centennial of American independence which it is planned to observe in Philadelphia. The year 1926 also suggests itself as being the year of the building of a three-mile line from stone quarries near Quincy, Mass., to tidewater, reputed to be the first road on rails in this country.

The year 1927 also lays some claim to consideration, as being the centenary of the first appearance of steam locomotives in this country, and particularly of the run of the Stourbridge Lion, the first locomotive to be tried here. Also it was in this year that the Baltimore & Ohio was incorporated. The year 1930 is also suggested because it will be the centenary of the first regular train service in this country and also of the first appearance of the successful steam locomotive; while if the historians, particularly writers on transportation, are to be heard, the year 1928 must not be overlooked since it was on the fourth of July of that year that Charles Carroll of Carrollton laid the cornerstone which marked the beginning of construction of the Baltimore & Ohio, the first railroad built for public use. Incidentally, this year also marks the centenary of the chartering of the Charleston & Hamburg, a 136-mile line extending from Charleston, S. C., to the Savannah river, which was the first railroad to declare for steam operation exclusively and upon which the first locomotive built in America for regular service was operated.

In view of this array of information and the fund of other historical data which rewards the investigator's search, it is not surprising that the resolutions are non-committal on the centennial year. There is ground for difference of opinion as to the time of the real beginning of our railroads. Since there is apparently room for choice, a situation is created where other factors may be taken into consideration.

If it were necessary to proper action on the centennial proposal that the date of the celebration be settled, however, there should be little difficulty in arriving at a choice of the date. In 1928 are embodied the psychological characteristics which are desirable in the development of a plan such as this. It does actually mark the beginning of that era of feverish activity and widespread interest to which American railroad development is traceable. There are other factors to consider, among which are the opportunities to prepare thoroughly and the desirability of keeping the centennial sufficiently remote from other celebrations as not to be eclipsed by them.

But it does not appear necessary that a definite decision be made immediately regarding the date of the celebration or regarding questions as to how the centennial should be held and where. The important question is, Shall there be a centennial celebration? Let the railroads declare unequivocally for a centennial and at the same time authorize the creation of machinery to work out the details. This action should not be delayed too long. Better to start and fail (if that were conceivable) than never to start at all.

Advance of the Self-Propelled Car

THE PAST TWO YEARS have shown a somewhat slow but steadily increasing utilization of the self-propelled rail car. At the present time they are in service not only on many short line roads, but a considerable number of large trunk lines have one or more of them in operation. As a result of continued experience with this type of equipment, it is increasingly apparent that its field of usefulness is considerably wider than was at first apparent. It also has been found that while the small, light-weight car of the motor bus type has a definite place in the transportation field, there are other places where a considerably larger car, driven by a more powerful engine, is desirable.

The year 1923 added considerably to a better understanding of the various economic and mechanical factors involved in the problem of the self-propelled rail car. Real progress was made in the development of new and larger units. Not only were engines of greater power applied, but new types of control and transmission were built and placed in service. The already difficult problem of transmission is now complicated by a demand for double-end control and several cars recently built have been designed for such operation. Of the several transmission methods employed, mechanical, electro-pneumatic and hydraulic, the latter at present appears to offer the largest possibilities, particularly for the heavier

cars and where double-end control is necessary. Storage battery and gasoline-electric cars also are being built. With the exception of storage battery and steam engine driven cars, all cars recently built in this country have been propelled by some type of gasoline engine.

The interest in self-propelled rail cars is, however, not confined to the United States and Canada, but is world-wide and American builders already are beginning to appreciate the fact that the export field may offer large possibilities in the future. While attention naturally has been given first to the gasoline engine, which today is a highly developed piece of machinery for which excellent manufacturing facilities are available, engineers in other countries are giving increasing attention to the possibilities of the heavy oil or Diesel engine. At present, there are only a few rail motor cars so equipped, but the results are sufficiently promising to warrant American railroad men keeping a close watch of developments and preparing for the undertaking of similar installations in this country. However, those who have given the most attention to the matter consider that the best immediate procedure is to push the development of the gasoline-engine driven car and perfect the transmission system for heavy units. Then if the Diesel engine is found to be superior to the gasoline engine, a substitution can be made without delay while waiting to perfect a suitable type of transmission.

The Way of a Government With a Railroad

"IF SOME PLAN could be worked out whereby every voter in the country could go down to Washington and spend six months in the employ of the government, the agitation for government ownership of railroads or anything else would quickly disappear"—this was the statement made recently by a distinguished economist who has had years of experience in government service. This means of educating the public, however, is obviously impractical and some other method must be found of letting the people know what would probably happen to the railways under government ownership. One such method would be to examine the conduct of other activities in which the government is actually engaged. Another would be the observation of the operation of government-owned railways in other countries.

Some of the conditions existing in government departments in Washington today may profitably be considered from the point of view of how railroad men or business men would like to work under them. Some fifty years or more ago Congress passed a law making an allowance of four dollars per day for living expenses for government employees absent from Washington on official business. Doubtless at that time this four dollars would provide as many luxuries in food and accommodations as three times the sum now would; but, in spite of the shrinkage in the value of the dollar since that day, this allowance still stands. An important official in one of the departments at Washington, a man drawing a salary of around $5,000 a year, who is called upon to make frequent trips over the country to consult with men of affairs, is allowed only this pittance, the same as that received by a minor clerk doing routine work at a salary of $1,000 per annum.

Promptly at nine o'clock in the morning the office timekeeper comes around to see whether this $5,000 expert is at his desk, just as if he were a messenger boy or a janitor; and, what is more, if he is a few minutes late, just so much time will be deducted from his annual vacation, time worked after closing hours not considered. We know personally of a doctor of philosophy employed at a fairly high salary in one of the departments making a scientific investigation which required all the skill of his years of training and this man was allowed no stenographic or clerical assistance; he spent fully half of his time at the adding or calculating machine making computations which could have been made more rapidly and just as accurately by a clerk at one-third his salary. But what difference did this make to the head of the division in which this man was employed? Congress had made an appropriation covering a certain investigation which this division was making. When such an appropriation is exhausted the investigation, if it is not completed, will stop until more money is appropriated. There is no competition among division heads to see who can do the greatest amount of work for the least money, and appointments, promotions and dismissals are not made on that basis. What railroad man would willingly exchange the conditions under which he now works, although they may not be entirely satisfactory, for conditions such as these?

These are only a few of the more obvious conditions which one will find frequently in government service and never elsewhere. But how about conditions where railways are operated by the government? Do the same bureaucratic methods obtain? We quote from a letter written recently by an officer of a company which is engaged in iron mining in South America:

> Then I have been busy and much worried over the car situation on the government-owned railroad, which we have to deal with for our ore transportation. The road is short of rolling stock, and has no funds to repair cars or purchase new ones, and we cannot make suitable arrangements for supplying the road with cars or the repairing of some of its bad order stock. The road is willing to take anything you give but makes no guarantee that it will pay for the cars in case it does not haul the ore. God help a country with government-owned railroads and the United States will be unfit to live in if this is brought about there. In May the road was so short of coal that it had to cancel all freight (imperishable).....

This is the story of a government railroad from the shipper's point of view. In the Annual Review Number of the *Railway Age*, the issue of January 6, was published a series of articles on the railways of the world which gave a picture scarcely less gloomy of most of the government-operated railroads from a point of view of finance and administration. Many of these government-owned roads were more successful in 1923 than in the previous year; some of them, considering their handicaps, did even better than could be expected. However, the fact remains that if one should list all of the private railways of the world in one column and all the government railways in another, the separation thus made would not fall far short of dividing the successes from the failures.

It is difficult to see why anyone with a knowledge of how the government conducts the affairs it already has under its control and how most foreign governments which have entered the railroad business have applied similar methods to it can seriously advocate government ownership and operation in this country.

If a man wishes to make his mark in the world as a physicist or chemist or biologist he begins by learning everything he can which has been discovered by his predecessors and by his contemporaries in other countries; he does not shut himself up in a cell and begin by the trial and error method alone and unaided to build up the whole science himself. This is the secret of all scientific progress; the beginning of each new generation upon the foundation of knowledge acquired by all its predecessors. Can successful railroad administration safely rely upon any other method? Can a sane policy of railroad regulation in this country be assured unless those responsible for our national railroad policy—in the final analysis, the people—are supplied with the facts regarding government operation in countries where it has been given a thorough trial?

Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

The Freight Traffic Red Book [1924], compiled and edited by Harry G. Williams and Charles J. Fagg. "A practical reference book for those actively engaged in traffic work." 608 p. fold. map. Published by Traffic Publishing Co., New York City. $6.00.

Official Report of Capt. S. Robinson, R. N. R. Commander of the Canadian Pacific S. S. Empress of Australia, on the Japanese Earthquake, the Fire and Subsequent Relief Operations [*Sept.*], 1923. 24 p. 2 illus. Published by the Canadian Pacific Railway Co., Montreal, P. Q.

Outlines of Railway Economics, by Douglas Knoop. Revised edition including discussions of war control of British railroads, and consolidations. 274 p. Published by Macmillan & Co., Ltd., London, Eng.

The Results of Government Ownership in South Africa, by M. H. deKock. Part I, Section A is devoted to railways, the other parts discussing harbors, telegraphs, and other government-owned industries. The concluding chapter takes up government ownership and economic development. 187 p. Published by Juta & Co., Ltd., Cape Town, S. A.

The Twentieth Century, by Howard Elliott. Talk by Chairman of the Northern Pacific Ry. Co., before Harvard Club, New York City, December 29, 1923. 26 p. Publisher not given, but probably obtainable from offices of the Northern Pacific Ry. Co., New York City.

Periodical Articles

An Era of Consolidations, by Franklin Snow. Various problems connected with railroad consolidation. Atlantic Monthly, February, 1924, p. 259-265.

A Fair Deal for the Public, by Amos Pinchot. One side of a discussion of Transportation as a 1924 campaign issue. Forum, February, 1924, p. 201-206.

A Fair Deal for the Railroads, by Jules Semon Bache. Another side of a discussion of Transportation as a 1924 campaign issue. Forum, February, 1924, p. 198-201.

Has the "Zero Hour" Struck for the Rail Advance? by Barnard Powers. Suggestions as to effect of consolidations on prosperity of the railroads. Magazine of Wall Street, February 2, 1924, p. 570-573, 644.

The Railroad Problem up to Date, by Samuel O. Dunn. Recent railroad history, and some of the measures proposed to "solve" the problem. Scribner's, February, 1924, p. 146-152.

The Railroads, the Ships, the Interior and the Coast, by H. M. Adams. Reprint of Mr. Adams' testimony before the Commission in the consolidation hearings. Oregon Voter, January 26, 1924, p. 18-26.

Railways of Today and Tomorrow, With Special Reference to Operating Aspects, by C. Travis. Discussion by Sir Wm. Acworth, Philip Burtt and others, p. 122-129. Journal of the Institute of Transport, January, 1924, p. 109-122.

Reduction of Freight Rates, by Senator Arthur Capper. Speech in Senate urging immediate reduction of rates on farm products. Congressional Record, January 24, 1924, p. 1408-1411.

Steady as She Goes, I-II, by Albert J. Beveridge. Two articles on railroad policy. Saturday Evening Post, January 26, 1924, p. 6-7, 60, 63, 65, February 2, 1924, p. 25, 42, 44, 46.

Unions and the Public, by George Soule. Comment on the articles by F. Lauriston Bullard, included in former lists. Atlantic Monthly, February, 1924, p. 211-220.

New Books

Master Blacksmiths' Proceedings. Edited by William J. Mayer, Secretary, 2347 Clark Avenue, Detroit, Mich. 147 pages, 5½ in. by 8 in. Bound in cloth.

This book contains a report of the proceedings of the twenty-seventh annual convention of the International Railroad Master Blacksmiths' Association, held at the Hotel Sherman, Chicago, August 21-23, 1923. The report of the proceedings has been carefully edited by Mr. Mayer and many papers are included which will be of interest and value to blacksmith foremen and others interested in the work of the blacksmith department. Considerable attention, for example, is given to the respective fields of the Thermit, oxyacetylene and electric welding processes in railroad shops. The book is illustrated.

Traveling Engineers' Association Proceedings. Edited by W. O. Thompson, Secretary, Cleveland, Ohio. 436 pages, 5½ in. by 8½ in. Bound in cloth.

A wealth of material of interest to traveling engineers, road foremen of engines and others is contained in this report of the proceedings of the thirty-first annual convention of the Traveling Engineers' Association, held at Chicago, September 11-14, 1923. Following a list of the 1923-1924 officers in the front of the book is the constitution of the Traveling Engineers' Association and a brief report of the subjects considered at each convention since the first held in Chicago in 1893. The report is divided into seven parts, one for each session of the association and the papers are presented in the order in which they were read. A comprehensive index in the back of the book enables any of the papers as well as the discussion by any of the members, to be located readily.

The National Cost of Railroad Accidents, by Lew R. Palmer, 120 Broadway, New York. Eighty-five pages of text (typewritten) and diagrams; size 8½ in. x 11 in. Paper cover.

This is an elaborate study of the accident records published by the Interstate Commerce Commission, including some tables which are not published in the government bulletins, the whole being summarized in a minute analysis, with elaborate diagrams designed to show the magnitude of the problem of preventing accidents, with considerable data showing what has already been accomplished in this direction; and especially the accomplishments of certain roads which are able to show records of the number of injuries to employees far smaller (measured by the number of cases per million man-hours) than the average for all roads. Some of the more significant tables and other data embodying this analysis, were reprinted in the *Railway Age* of December 1, page 1013. The author is conservation engineer of the Equitable Life Assurance Society, New York City, and, as was stated in our abstract, this material formed the substance of an address delivered by him at Buffalo, N. Y., on October 4, last, before the Steam Railroad Section of the National Safety Council. The great improvement in safety due to the diminution in the number of collisions during the past 10 years is one of the interesting things shown by Mr. Palmer's diagrams. The number of enginemen killed in passenger train operation, per thousand men in service, is much larger than the number per thousand killed in freight train operation, a fact not often noticed. In an appendix Mr. Palmer presents elaborate tables showing the aggregate transportation waste on the railroads of the country, in each year, since 1910. In 1920 it was $216,057,347; in 1922 less than half that—91 millions.

Letters to the Editor

Maintenance of Equipment Expenses

DEVON, Pa.

TO THE EDITOR:

In addition to the factors tending to increase the percentage of equipment maintenance enumerated by Mr. Edmondson in his letter in your issue of January 12, there is the greater density of traffic resulting in more equipment per mile of road, in fuller loading of cars and in cutting down the cost of transportation relatively to equipment maintenance.

FRANCIS RALSTON WELSH.

College vs. Non-College Men on the Railroads

GREENFIELD, Mass.

TO THE EDITOR:

I have read the article entitled "College Students and Seniority" by Alonzo Swartz in your January 19, 1924, issue.

I agree with Mr. Swartz that railroad officials are greatly handicapped by government regulations. Who are responsible for these various regulations? Our different state legislatures and the Congress of the United States, which he will have to admit are made up of men the majority of whom are college graduates! So much for what the college men have done for the railroads.

Now as to the low standard of education that exists among the railroad employees and which Mr. Swartz claims is due to seniority rules. I am sure that railroad officials are not so shortsighted but what they would acknowledge the ability of a man, who can enter the employ of a railroad and offer suggestions for the betterment of transportation and economic operation in the degree that Mr. Swartz claims a college student can, and reward him by promotion in such a way that seniority rules could not interfere.

Mr. Swartz gives the impression of one who feels that because he has put in four years in college, he can go out on a railroad and take a position of responsibility or authority and do better than a man that has put years into it. If such is the case he is due for a rude awakening, as he will find that the railroad game is an education in itself, just as other lines of business are, and the only way a man can hold a responsible position connected with them is to learn from the bottom up; that is, if he is to be a success.

I heard a high railroad officer say recently that as a whole, he believed railroad employees to be more highly educated than the employees in any other large industry where the rates of pay are anywhere near the same. This statement was made by a man who has had years of experience and can be depended upon.

To give the college graduate his just due, I will admit that after a man has put in four years at college he should be entitled to hold a position better or higher than one held by a person that has not had the good fortune to have received a college education; but has Mr. Swartz ever considered that the point of saturation, insofar as college graduates are concerned, may at some time be reached? Only very recently a college graduate, who is a civil engineer, told me that in his capacity as civil engineer he was getting only $25 per week. I was dumbfounded and asked him to explain the reason for such low pay. His reply was that the country is flooded with civil engineers and that there are three or four men for every job. If conditions are coming to such a pass, I fail to see why a man holding a position on a railroad should have to give way to a college student, for the simple reason that he was not as fortunate with regard to education—this, of course, providing he can cover his position to the satisfaction of his superiors. Some college students have started in the railroad game; some of them are still sticking and others have found that their opportunities were limited and have become discouraged and have transferred to other fields. I might add that there are a lot of others without college educations that have done the same thing and they did not require a college education to discover the limitations.

Some of these facts are perhaps a few of the reasons why the employees have enslaved themselves to seniority. Can they be blamed?

A. J. DUGAS.

Excess Irregularity of Employment

NEW YORK.

TO THE EDITOR:

After reading the editorial in the *Railway Age* of December 22 upon the above subject, and the various articles recently published in the same periodical about co-operation in different forms and from different viewpoints—all seeming to agree upon the necessity or advisability of co-operation—it leaves one with only moderate mental endowments, just a little confused.

Irregularity of employment will do more to help destroy co-operative effort on the part of the railroad employee than any single thing that can be done by a railroad management.

If a railroad management does something that is apparently un-economical and its employees suffer in consequence, as they must when repairs of equipment are deferred, conclusions are reached that the railroad managements are not sincere in their expressed wish for co-operative effort on the part of their employees. Also that they misconstrue the meaning of the word co-operate, or that those managers putting into effect a plan to defer maintenance of equipment fail to realize what this plan costs their roads.

It will be conceded, the writer thinks, without lengthy analysis, that a car-day costs a railroad approximately one dollar, whether the car on its line is owned or leased.

The cost of car possession is not under present accounting methods charged directly to transportation expense, but becomes buried in rentals, interest, etc., and is sometimes lost sight of by the busy railroad officer.

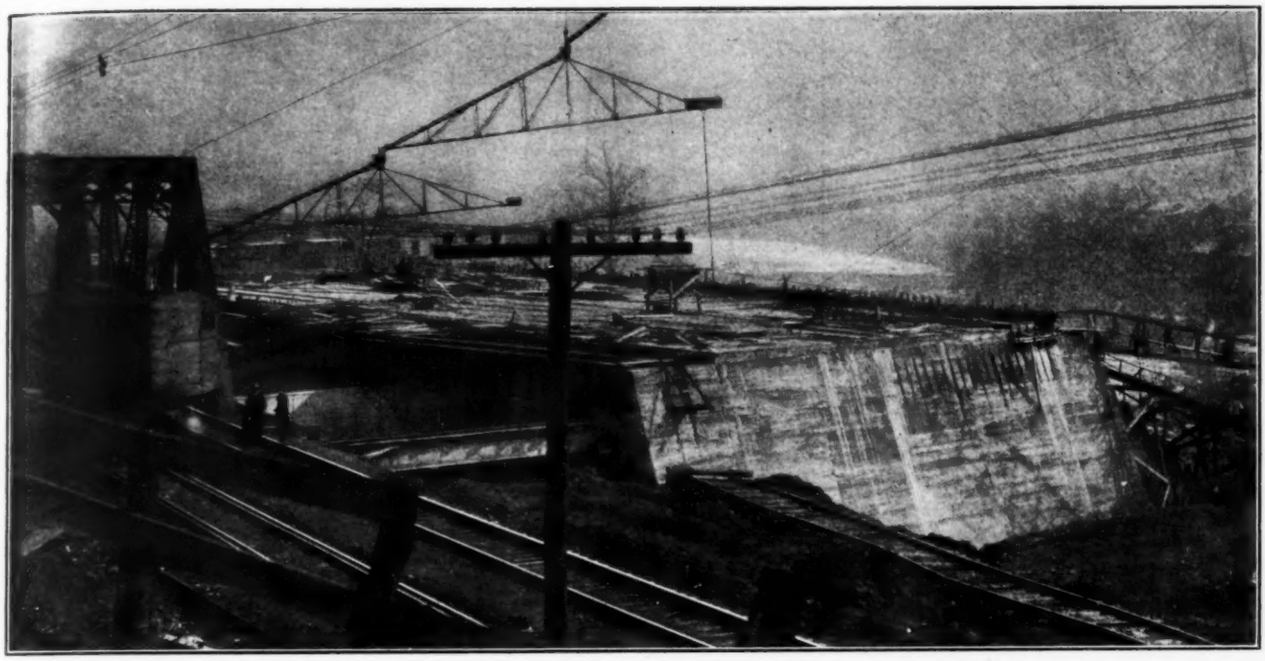
Without any idea of criticising, not knowing all the facts, the following illustration of an actual occurrence will show the cost of deferred car maintenance from a different angle from that usually taken.

During the year 1921, a certain railroad allowed its bad order cars to accumulate; the result is shown in the following tabulation:

Daily average number of bad order cars (year 1922)	10,962
Daily average reasonable number of bad order cars	3,000
Difference, or daily average in excess of a reasonable number	7,962
Average cost of repairing each car (railroad estimate)	$600
Total cost of repair 7,962 cars	$4,777,200
Cost of possession of excess bad order cars	2,906,130
Difference	1,871,070

Assuming that the cost of repairing these cars will remain nearly constant, it will still cost $4,777,200 to put these cars in service; adding to this $2,902,115, the cost of possession of excess idle bad order cars, the total cost will be $7,672,715. In other words it will actually cost, to let these excess bad order cars remain idle, 61 per cent of what it would have cost originally to repair them. Strict pay roll economy is, sometimes, expensive.

C. E. LEE.



Jackson River Bridge Which Will Carry 22 Tracks

Clifton Forge Terminal Involves Heavy Work

Chesapeake & Ohio Makes Rapid Progress in Construction of New Facilities to Improve Operation

OWING TO THE INADEQUACIES of the present facilities, the Chesapeake & Ohio has had under way for some time a $3,500,000 program for the extension and reconstruction of its yard and terminal at Clifton Forge, Va. Among the first work done at this location was the construction of a new engine terminal. This was described on page 955 of the April 22, 1922, issue of the *Railway Age*. The other work at this point involves a number of engineering and operating problems of considerable magnitude. In order to construct the yard it has been or will be necessary to move or raze about 80 dwellings, change the channel of a river at two places and erect three bridges, one of which, when completed, will be 329 ft. wide and will carry 23 tracks.

Existing yard facilities at Clifton Forge consist of 43 miles of track over an area of 398 acres and are wholly inadequate to accommodate the present traffic, which, for a 30-day period, has amounted to an average of 99 trains and 1,746 cars, including 1,000 loads, a day. During periods of maximum traffic, it has been possible to move trains through this terminal only by requiring yards east and west of Clifton Forge to perform switching which properly devolves upon that terminal. This condition has caused serious delays, complications and excessive costs. To overcome this situation and to provide for possible future increases in traffic, the Chesapeake & Ohio has designed and started the construction of an enlarged and modern freight terminal at this point. It will include a total of 66 miles of tracks over an area of 636 acres and, when completed, will be a counterpart of that road's westbound receiving and classification yards at Russell, Ky.

Improvements begin at a point about 500 ft. west of the Clifton Forge passenger station and extend for three miles through the town of Clifton Forge and Selma, a suburb, to Low Moore. In order to carry out the plans, it was necessary to move or raze 80 dwellings in Clifton Forge and Selma, and to change the channel of Jackson river at two places. This improvement involves more than 2,000,000 cu. yd. of excavation. Changes in the river bed require approximately 1,500,000 cu. yd. of material for fills. In addition to the construction of three bridges, it also is necessary to make a change about 5,000 ft. long in the Midland Trail, a part of the Virginia and national highway system.

Generally speaking, this project is divided into two parts: The construction of a receiving yard and the construction of a classification and forwarding yard. The receiving yard will embrace ten 100-car tracks and a double-track hump, with scales in each track. There will be two main line tracks and a thoroughfare track. The hump will be located at the eastern end of the receiving yard with a 1 per cent grade from the summit through the ladder tracks and a 0.5 per cent grade along the classification tracks.

The classification yard also will be about 5,000 ft. in length, with 20 tracks sufficiently long to hold 100-car trains. In addition, it will include two main line tracks and a car-rider track, making a total of 23 tracks.

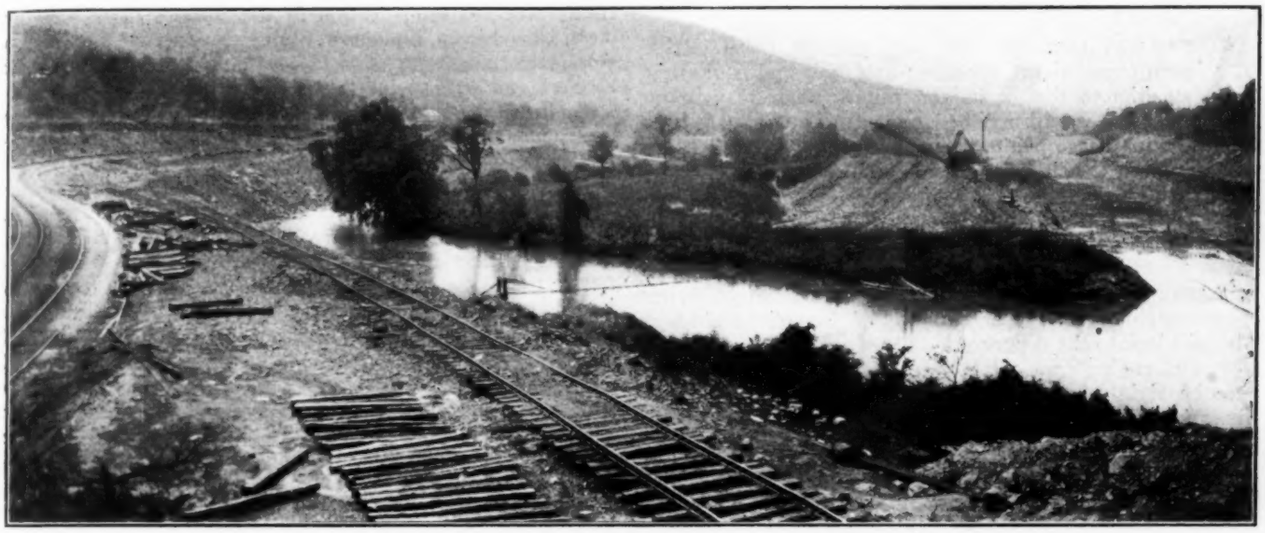
Near the western end of the classification yard is one of the unusual features of the entire project. A new deck-plate girder bridge with a reinforced concrete deck is being constructed over Jackson river to carry the 23 tracks of the classification yard. This structure will have two abutments and three piers of concrete on which will be placed the steel girders and on the girders will be poured the concrete slab, two feet thick. The bridge will be 30 ft. high, 260 ft. long, 329 ft. wide, and will require 7,200,000 lb. of steel.

Map Showing the Added Facilities and Reconstruction at Clifton Forge, Va.

Piers and abutments will require 26,000 cu. yd. of plain concrete masonry, and there will be 3,500 cu. yd. of reinforced concrete slabs. It is estimated that 750,000 lb. of reinforcing steel will be used. One and one-half million board feet of timber will be required in the cofferdam.

There will be four spans in the new bridge, and in order to make room for it the present double-track, two-span bridge must be moved northward about 150 ft. from its present site. In addition, the present state highway bridge must be replaced by a new bridge located 50 ft. north of the new railway bridge. This part of the work is being done by the Commonwealth of Virginia, the Chesapeake & Ohio appropriating sufficient money to the work to replace the present early type deck Pratt truss bridge. The highway bridge necessitates a new approach and it will require about 100,000 cu. yd. of material to make the necessary fill.

At the eastern end of the improvement there begins what is known as the Clifton Forge cut, which requires about 1,000,000 cu. yd. of excavation. The river is encountered at the western end of this cut, and on the other side of this 100-ft. stream is the Selma cut, which involves about 700,000 cu. yd. of excavation. Then comes the first fill in the river, made necessary by the presence of a small church and grave yard. At this point the old bed of the river is being filled for a distance of 3,600 ft. in order to provide space for the 13 tracks of the new receiving yard. Beyond this fill comes another new embankment in the river, 1,600 ft. long. This second fill will make possible a reduction in the main line curvature from 6 deg. 45 min. to 3 deg.



Lower Change of Jackson River and the Section of the Old Channel Being Filled In

West End of Clifton Forge Cut After the First Lift Was Removed

The construction of the new terminal is under the supervision of G. B. Wall, vice-president; C. W. Johns, chief engineer, and E. G. Rice, resident engineer. The contract for the work was let to the Brooks-Callaway Company, Atlanta, Ga.

The Efficient Passenger Train Conductor*

By F. R. Pechin
General Superintendent, Chicago, St. Paul, Minneapolis & Omaha

A RAILWAY COMPANY may have efficient ticket clerks, even expert ticket salesmen; and road and equipment superior to that of its competitors; there may be no expense spared; yet all may be rendered nil by the passenger conductor in charge of the train, in whom passengers place their trust while using their transportation.

In selling tickets the railway has only taken the first step in securing a patron. Indifferent service usually means that that particular railway will be used for one trip only. The passenger conductor, to be really successful as such, must be a man who likes the work and is capable of assuming the responsibility of proper handling of the entire train and who will look to the deportment and acts of every man in the train and engine crew. His years of experience, if experience be rightly used, give the conductor a confidence in himself and he requires the train and engine to be properly handled; also that patrons be treated with consideration.

A passenger conductor should read and study a great deal during his spare time (which is greater than that of most occupations) and become fully posted on matters relating to tickets, routes, stopovers, limitation of privileges by tariff, baggage, etc., so that all transactions between passengers and conductor may be correctly handled; and if the conductor has studied the instructions he will carefully and clearly explain the regulations, usually to the satisfaction of passenger, leaving him with a high regard for the train service of the railway and efficiency of its conductors.

A case in point: When making a trip east on a fast extra fare train, I happened to observe the attitude of the conductor (a man old in service), while collecting transportation. He came to a passenger sitting opposite me who was making a transcontinental trip and had been furnished an itinerary from starting point to destination, but apparently had not been informed of the extra fare feature. The passenger asked for an explanation which the conductor was unable to give satisfactorily and the passenger refused to pay. The conductor passed on, later came back but still the passenger refused to pay; later the brakeman came to this passenger, explained the matter apparently to the satisfaction of the gentleman, who then paid the extra fare. The brakeman either had a better knowledge of the extra fare regulations, or was better able to explain, or exercised greater diplomacy than the conductor.

If a conductor will make a study of instructions, he has taken the first step towards efficiency. Knowledge to meet any emergency gives him confidence and as a result he will feel and act in a manner that imparts confidence not only to the train crew but to the passenger as well.

I once knew an old conductor—old in years, old in service, but not old in heart, nor in actions. He ran a very heavy train. I observed his work many times; he seemed never to be in a hurry when collecting tickets, always had time to look at them carefully; to answer any and all questions, and always seemed to give any passengers all the time necessary to satisfy themselves as to information desired; and yet I never failed to see him complete his work of collecting transportation before reaching the next stop. He was always kind, considerate, approachable, and ready to give good advice, make satisfactory explanations, or give any information a passenger might desire. His entire crew always worked in the same manner, giving to the public a service never criticized, frequently commended. He had red hair, yet the proverbial combination of red hair and temper was not true in his case; as no man ever knew him to lose his temper while on his train. His kind disposition and consideration of passengers were a wonderful example. He was master of the ship. He was in full charge, realized it and accepted entire responsibility for the safe and proper operation of his train; observed the attention to their duties of the engine crew, baggagemen, brakemen, dining car employees, Pullman employees, newsboys; also noted that patrons received the comfort and service due them.

Brakemen should be trained to assist passengers upon entering or leaving the train and to give only reliable information to passengers.

A passenger conductor who quietly walks through his train after each stop or at other times if stops are infrequent, observing the heating and ventilation, will often find a very anxious passenger who has been waiting for just the opportunity (when the conductor did not appear to be too busy) to ask him for some much needed information; and how appreciative they are when it is carefully, intelligently and cheerfully given them, and they feel assured you are interested in their trip.

Reading and visiting by conductors greatly detracts from the time that should be given to the handling of trains and the care and comfort of passengers on the train.

To ride all day on trains with some passenger conductors and their crews, is a day of rest, comfort and pleasure. The conductor is quiet, gentlemanly, kind, courteous, observing of every detail, and his work is performed in such a capable manner that passengers very soon acquire a feeling of confidence and safety. Hat checks where used, are taken up just before passenger reaches destination and passengers informed their station will be the next stop, stating perhaps "Will reach there in — minutes."

Doors should be quietly opened and closed, and not kept open unnecessarily, as this quickly changes the temperature of a car. Vestibuled doors and traps should be closed carefully and quietly and not slammed as if with a desire to make all noise possible. On leaving stations with vestibuled trains, trainmen should look out and see that no one is hanging on steps outside of vestibule unable to get in. Unfortunately all conductors do not so handle their trains, but most men can be trained to the necessary degree of efficiency. In many cases lack of proper effort to instruct trainmen in passenger service results in justifiable complaint.

*Abstract of an article in a circular distributed to employees.

P. & A.

A Too-Familiar Story

Forecasting Future Volume of Railway Traffic

View Presented on Basis of Mathematical Study That Recent Estimates Are Not Large Enough

By John Balch Blood
Valuation Analyst, Interstate Commerce Commission

THE IMPORTANCE of the volume of traffic in any consideration of railroad forecast can not be over-estimated. The traffic in the coming double decade on the basis of the present civilization aspects is given herewith.

In view of this paramount importance, the technical analysis of the supporting argument is here given in sufficient detail that it may be open to the searching test of all, for any possible error.

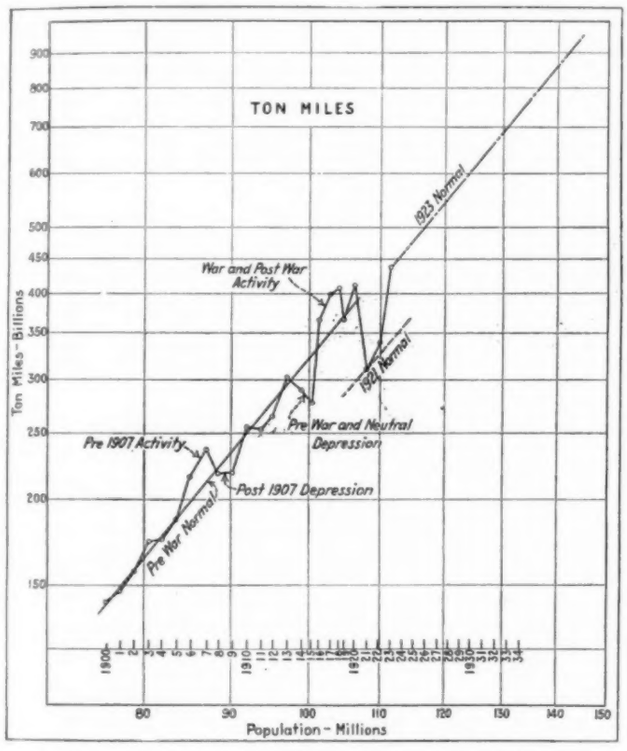


Fig. 1—Forecast of Railway Revenue Ton-Miles

Statistical forecasts recently seem to have been balked by the war aspect of population. Statistical trends have been taken on the basis of time. The basic hypothesis of all statistics predicated on human activity is "other things being equal" or the stability of civilization. It would seem to be clear to anyone that if a given aspect were maintained on a time basis where later it could be shown that the population increase was less than normal, the conclusion should be drawn that the functional aspect in regard to population must have increased. Again, and in a measure conversely to the last thesis, if we have a decreasing population, the same must be allowed for in any future predications.

Human activity is a function of population and not of time. If the population increases directly as a function of time, activity will also show apparent functional relation to time. But where the normal population increase has been disturbed these statistical results on a time basis become misleading and we must make our observations on the basis of population.

The population increase in the double decade from 1890 to 1910 was reasonably uniform around an annual ratio of 1.0192. The annual ratio during the decade 1910-1920 was far from uniform, varying from 1.006 to 1.020 and averaging 1.0143, as taken from the population figures of the Bureau of Economic Research. With such a variation in the function of population with reference to time, any predication assuming such to be constant introduces a corresponding error.

It is evident that if everyone consumed a given amount that the consumption of a nation would be proportional to the population. We find from experience that some aspects of human activity increase, in greater measure than directly with the population, in geometric ratio even to the third power. We would naturally expect that the annual product

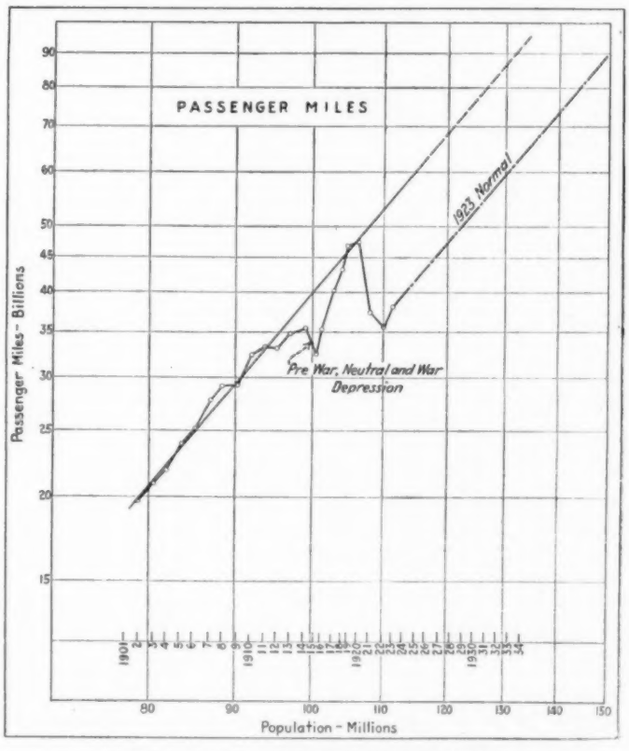


Fig. 2—Forecast of Passenger Miles

of a nation would increase with the population. We find that it is also augmented by a rise in the standard of living, and by the increased increment in capital saving. Again it would seem reasonable that the ton-mileage transportation of freight would be proportional to the annual product. There is perhaps an additional reason why such ton-mileage should increase even at a greater rate than the product on account of the constantly increasing use of transportation as a cheaper form of industrial production. It is found that

the ton-mileage varies approximately as the third power of the population.

With an aspect varying as the third power the error introduced by assuming the annual population increment constant is greatly augmented. If we assume the 1910-1920 population increase the same as the two preceding decades the error so introduced would be 1.5 per cent per year or about 16 per cent for the decade.

The current annual population increment is not as much as the 1.0192 of the 1890-1910 period but is greater than the 1.0143 of the 1910-1920 decade. In the present calculations it is taken as 1.016 from 1920 on.

When you consider that forecasting from year to year, for a period of years, multiplies the annual error on a geometrical basis, it becomes of the greatest importance to base such forecasts on the real functions with statistics collated with the greatest accuracy. With the disturbance in the 1910-1920 decade of the population trend with reference to time, it is recommended that all aspects of human activity be investigated on the basis of population.

It is proposed to show in the present thesis from statistical data of the 20 years 1901-1920, first, that the railroad

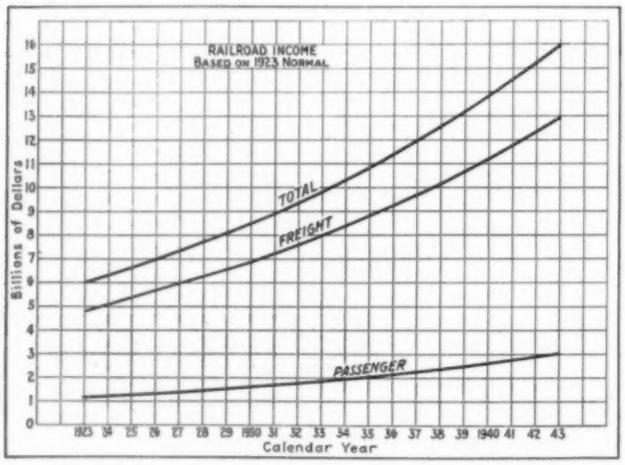


Fig. 3—Forecast of Railway Freight and Passenger Revenues

output in ton-miles and passenger-miles varies as a function of the population, and, second, that this function is approximately the third power.

Fig. 1 shows the ton-miles of freight traffic plotted on the basis of population. The plotting is logarithmic in both scales. In such plotting if an aspect trend can be represented by a straight line the function between the two variables is exponential, the exponent being the natural tangent of such straight line.

The solid line would seem to represent amply the normal from 1901 to 1919. The variations emphasize rather than detract from the emphasis of such normal. The 1907 boom and 1908 reaction are clearly shown. The prewar and neutrality depression of 1914 and the postwar activity of 1918-1919 serve only further to emphasize such normal.

From the plot the natural tangent of this normal line is 1.22. This must be measured in inches or direct units of length and not taken from the logarithmic scales. The ordinate rise for a given abscissæ distance is constant at 1.22. For accuracy in plotting the abscissæ scale of population has been extended in a ratio of 2.5 to 1 as compared with the ordinate scale, requiring the introduction of this factor in mathematical calculations. The equivalent natural tangent is then 1.22 multiplied by 2.5, or 3.05, which is the exponential function of ton-miles with reference to population.

This figure of 3.05 may be derived directly. The prewar normal gives for 1900 a population of 76 millions and a ton-mileage of 140.5 billions. Similarly for 1919 from the line we have 104.1 millions population and 368 billions of ton-miles. The population ratio of increase is 1.371 and the ton-mileage increase is 2.62, giving an exponential function of 3.05.

Accurate calculations should use this figure, but it is so close to the unit 3 that for all except the most careful work the integer three could be used and be well within the errors of original observations of supporting data.

It is not intended to discuss the variations from the normal or the shifting of the normal trends. It is presented that the 1901-1920 data amply support the normal of the civilization of that period as one of constant function to the population and that such function is the 3.05 power. On such demonstration if we have reasonably stable conditions of civilization we may confidentially expect to forecast with this figure. In the plot the 1923 figure of 440 billion ton-miles as a base and the same angle as the prewar normal. From the above we may state the functional relation of ton-miles to population for prewar normal as,

$$TM = \frac{2.57\ P^{3.05}}{10^4}$$

Where TM = ton-miles per annum in billions
P = population of continental United States in millions.

With a uniformly increasing population a simpler formula is possible. The current normal aspects of civilization and immigration seem to warrant an annual population increase ratio of 1.016. This would give a ratio figure for ton-miles using the 3.05 power of 1.05.

We then can express the ton-miles with reference to a base year as follows:

$$TM = 440\ (1.05^Y)$$

Where TM = ton-miles per annum in billions
Y = number of years after 1923.
1923 = base year.

This is a general formula for forecasting the ton-mileage of railroad freight assuming the normal aspects of civilization the same and the annual increment to population 1.016.

On a similar basis we plot the passenger-miles functioning with population in Fig. 2. The basic normal from 1902 to 1919 is shown in the heavy line. The 1907 augmentation from the normal is in evidence as well as the neutral and war decrease and the postwar increase.

From the plot the exponental function for passenger-mile relation to population is slightly less than that of the ton-miles and shows 2.97.

Similarly as in case of the ton-miles, the passenger-miles may be predicated from the formulæ,

For prewar normal—

$$PM = \frac{4.54\ P^{2.97}}{10^5}$$

For 1923 normal—

$$PM = \frac{3.18\ P^{2.97}}{10^5}$$

$$PM = 38.3\ (1.0483^Y)$$

Where PM = passenger-miles per annum in billions
P = population of continental United States in millions.
Y = number of years after 1923.
1923 = base year.

The main railroad product of continental United States as calculated for the next 20 years from these formulæ is shown in the table at the top of the next column.

There is evidence of apparent stage fright among economists and statisticians in the publication of their results in this bailiwick. They seem to lack the courage to use the

factors demonstrated by years. For instance, the period 1902-1919 demonstrates an increment in ton-mileage from year to year of 1.0597. Yet a prominent authority is quoted as giving 420 billions of ton-miles for 1923 and 560 billions for 1933, giving an annual increment ratio of 1.0292 and

Calendar Year	Ton Miles (Billions)	Passenger Miles (Billions)
1923	440	38.3
1924	462	40.2
1925	485	42.2
1926	509	44.3
1927	535	46.6
1928	562	48.9
1929	590	51.3
1930	619	53.9
1931	650	56.6
1932	683	59.4
1933	717	62.4
1934	753	65.5
1935	790	68.8
1936	830	72.2
1937	871	75.8
1938	915	79.6
1939	960	83.6
1940	1,009	87.8
1941	1,060	92.1
1942	1,112	96.8
1943	1,167	101.6

giving no reason, with experience showing an annual increment of nearly 6 per cent, why it forecasts on a basis of less than 3.

As a matter of fact, the 5.97 per cent increment is with a population increment of 1.92. If we use as the present normal 1.6 as the population increment for future years and the same functional aspect of ton-miles to population as experienced from 1902 to 1919, the annual increment would be 5 per cent, still an amount much greater than the 2.92 per cent.

Our statistics should be our aids. We should not outrage them by our preconceptions, prejudices or fears. If factors of experience carefully and skillfully deduced present certain conclusions, we should use such in our consideration and not mutilate them. Of course extravagant results naturally enjoin a careful survey of all the supporting argument; but if no errors or unsupported assumptions can be located in the supporting figures, the situation demands the conclusions as a basis of consideration.

And so I ask that this problem be considered with courage, competence and skill and not beclouded by the timid and fearful. Civilization, industry and railroads have shown a large and continuous increase, and without ample reason otherwise, we must expect the same result in the future following similar conditions.

The statisticians show for the first eight months of 1923 an accrual of income from freight at 1.109 cents per ton-mile and from passenger returns at 2.999 cents per passenger-mile. Using these figures, we present the following railroad main income for the two future decades.

RAILROAD MAIN INCOME (1923 NORMAL)
(In Millions of Dollars)

Calendar Year	Freight Income	Passenger Income	Total	Annual Increment	Increment Over 1923
1923	4,789	1,148	5,937	...	....
1924	5,124	1,206	6,330	393	393
1925	5,380	1,266	6,646	316	709
1926	5,649	1,330	6,979	333	1,042
1927	5,931	1,396	7,327	348	1,390
1928	6,228	1,466	7,694	367	1,757
1929	6,539	1,539	8,078	384	2,141
1930	6,866	1,616	8,482	404	2,545
1931	7,209	1,697	8,906	424	2,969
1932	7,570	1,782	9,352	446	3,415
1933	7,948	1,871	9,819	467	3,882
1934	8,346	1,965	10,311	492	4,374
1935	8,763	2,063	10,826	515	4,889
1936	9,201	2,166	11,367	541	5,430
1937	9,661	2,274	11,935	568	5,998
1938	10,144	2,388	12,532	597	6,595
1939	10,651	2,507	13,158	626	7,221
1940	11,184	2,633	13,817	659	7,880
1941	11,743	2,764	14,507	690	8,570
1942	12,330	2,902	15,232	725	9,295
1943	12,947	3,047	15,994	762	10,057

Figure 3 shows the expectation with existing civilization aspect and existing rate, price and wage levels. It is not probable that all of these will remain constant for long periods of time. While the change in railroad rates results in marked changes in traffic, the changes in income are greatly less. The changes in wages not compensated for by change in rates have far more effect in railroad net income than rate changes.

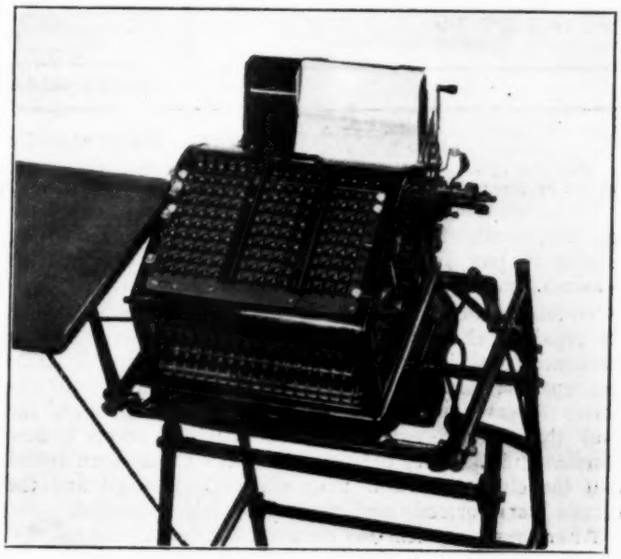
It is to be expected, with the increasing density of traffic occasioned by the volume of succeeding years, that rates will be considerably lower.

However, taking into consideration all these various points, the herewith expected traffic is set forth as a normal of present conditions with ample supporting argument; warranting it as a basic hypothesis in railroad forecasting.

Handling Car Repair Bills Efficiently

MARKED ECONOMY and saving of time have been secured by the Norfolk & Western through the practice of having car billing repair cards made out in the office of the superintendent of motive power and of preparing bills against owning roads on specially designed combination billing and adding machines. The method of handling car repair bills is as follows:

Each item of repair to a foreign car is recorded on the "Original record of repairs," Norfolk & Western form M. P. 407. After the M. P. 407 is checked by the gang foreman a "Billing repair card," Norfolk & Western form M. P. 37,



Burroughs Duplex Adding Machine

is filled out and each item of repairs thereon priced in accordance with the A. R. A. rules and code of prices. Prior to March, 1920, it was the practice on the Norfolk & Western to have all billing repair cards covering repairs to foreign cars prepared at the point where repairs were made. This required a substantial clerical force, thoroughly familiar with the rules of the American Railway Association and the prices prescribed therein. After these forms were completed and priced, they were sent to the office of the superintendent of motive power, where they were assorted and checked and bills made against the owning railroad. The bills at that time were all written by hand. All this required a great amount of time, and, as was the invariable experience, the office was never able to do better than prepare the bills and

get them out for mailing to the different foreign roads for payment faster than a month or two after the repair work was finished.

By the new method a central bureau was established in the office of the superintendent of motive power, known as the A. R. A. Billing Office. The new plan provided for the daily forwarding of the "Original record of repairs" to the superintendent of motive power, in order, if possible, that the work of preparing bills might be handled currently and bills forwarded to the railroad responsible near the first of each month and covering work performed on its cars during the month closing. Under this plan, the N. & W. receives its pay for work performed on foreign cars at least a month sooner than under the old system.

To this central A. R. A. billing office, all forms M. P. 407 for repair work that should be made against foreign lines for repairs to their cars on the N. & W. are forwarded. Billing repair cards are then prepared from the M. P. 407 reports; the cards are priced, and, in fact, all this part of the work that was formerly done at the outlying points is now handled uniformly at the central office. It has been found that the clerical work is more efficiently handled and the details more correctly and more uniformly controlled.

After the new system had been in effect for several months, and the work well established, machines that might handle efficiently certain parts of the work that was at that time being executed by hand were sought. In time, two specially designed combination billing and adding machines were put in operation. These are now being used for the writing of the bills and from them is gotten the desired number of copies, at a rate much faster than the old plan of writing bills by hand. At the same time, neater, more accurate and better prepared bills are provided because they are typewritten. Great reduction has been made by the use of these machines in the time required for the handling of the bills and the closing of accounts between railroads.

The machines were secured from the Burroughs Adding Machine Company and are known as the style 2706 Duplex. In writing M. C. B. bills, the operator places the bill sheet in the Burroughs, enters car number, date and code number designating the place where repaired, using the repair slips as posting media. By touching the operating bar, the machine prints the three items. The carriage shifts automatically to the next position and the next three items—miscellaneous value, labor hours and wrot iron (lb.) are listed and printed in a similar manner. The second shift of the carriage brings the paper into position to print the next three items—malleable iron (lb.), lumber (ft.) and springs (lb.). As soon as these items have been printed in the last three columns, the carriage automatically returns to position for listing and printing on the next line. When the sheet has been filled, totals for the six columns (accumulated in the Burroughs) are automatically printed in the proper place. A credit column can also be posted, and added, if desired.

S. M. P.

STATEMENT OF REPAIRS TO CARS UNDER A. R. A. RULES

No. { Initial ____ Book ____ Page ____

Norfolk & Western Railway Company

Car Number	Date	Station	Miscellaneous Value	Labor Hours	Iron (pounds) Wrot	Iron (pounds) Mall.	Lumber Feet	Springs Lbs.
	9	19.20				$		$
228473	9	5.30	50					
234176	2		440					
417057	2		410					
108590	11		410					
115252	7		112					
770923	8		55					
406713	1		50					
315578	3		20					
339494	3		20					
405739	3		7					
Carried to Recapitulation			6906	187	4375			

† INDICATES "NO BILL" OR CREDIT ALLOWED

Car Repair Bill Prepared on Burroughs Adding Machine

Full size of paper for form is 8½ in. by 28 in. The form itself is 8½ in. by 14 in. and is in two parts. The second part is separated from the first by perforations at the top and is folded under on the perforated line to supply the carbon copy.

The Burroughs Duplex adding machine is also recommended for other mechanical department work as follows: Preparing summary of M. C. B. bills and distribution to operating expenses; posting of employees' time and compensation for I. C. C. wage statistics report; posting record of fuel used by locomotives; labor and material distributions to operating expense accounts, shop and store orders, etc., and for posting shop and store order ledgers.

Freight Car Loading

Washington, D. C.

Revenue freight car loading again reached a high level during the week ended January 26. The total, 891,326 cars, was slightly less than that for the week before but, like that for the week of January 19, it was higher than that for any previous corresponding week in January. As compared with the corresponding week of last year it was an increase of 21,862 cars and as compared with 1922 an increase of 150,940 cars. Decreases as compared with last year were shown in the loading of coke, ore and miscellaneous freight but there was an increase of over 10,000 cars in coal loading and of nearly 14,000 cars in merchandise. In the Allegheny and Northwestern districts the loading was less than for the corresponding week of last year. The summary as compiled by the Car Service Division of the American Railway Association is given in the next column.

Surplus freight cars for the week ended January 22 totaled

236,174, a decrease of 56,747 compared with the previous week. Surplus box cars numbered 106,543, a reduction of 26,021, while there also was a reduction of 29,065 in the number of surplus coal cars to 100,781. Reports also showed on January 22 a shortage of 2,484 freight cars, an increase of 505 compared with the number on January 14.

The railroads on January 15 had 159,552 freight cars in need of repair. This was 7 per cent of the ownership and

REVENUE FREIGHT CAR LOADING—WEEK ENDED SATURDAY, JANUARY 26, 1924

Districts:	1924	1923	1922
Eastern	212,614	207,428	177,189
Allegheny	179,903	192,013	147,873
Pocahontas	39,985	32,337	32,787
Southern	138,809	131,225	112,365
Northwestern	113,835	117,251	97,107
Central Western	144,749	134,502	117,951
Southwestern	61,431	54,708	55,114
Total Western Districts	320,015	306,461	270,172
Commodities:			
Grain and grain products	48,748	46,795	50,398
Live stock	35,706	34,974	32,236
Coal	204,396	194,382	179,816
Coke	12,465	14,497	7,527
Forest products	72,608	69,477	46,959
Ore	8,529	11,253	3,976
Mdse. L.C.L.	225,624	211,816	211,085
Miscellaneous	283,250	286,270	208,389
Total	891,326	869,464	740,386
January 19	895,276	864,297	731,109
January 12	872,265	872,908	714,191
January 5	703,269	767,296	599,433
December 29	.....	615,431	704,224
Cumulative loading to date	3,362,136	3,373,965	2,785,119

an increase of 1,377 over the number in need of repair on January 1, at which time there were 158,175. Of the total on January 15, 116,876 cars or 5.1 per cent were in need of heavy repair, a decrease compared with January 1 of 1,777. Reports also showed 42,676 cars, or 1.9 per cent, in need of light repair, an increase within the same period of 3,154. The number of cars in need of repair on January 15 this year was a decrease of 57,648 compared with the number on January 15, 1923, at which time there were 217,200 cars or 9.6 per cent.

The railroads also on January 15 had 11,341 locomotives in need of repair of 17.6 per cent of the ownership. This was an increase of 966 over the number on January 1.

Owing to a change just put into effect by the Car Service Division in the form used by the railroads in reporting locomotives in need of repair, comparisons with previous figures of the number of locomotives in need of both light and heavy repair on January 15 cannot be made. Under the change in form, the carriers are required to report, in addition to the locomotives in need of "running" repair, the number of locomotives in need of other repairs by classes. In accordance with the revised form, reports showed 6,138 locomotives or 9½ per cent of the ownership in need of classified repairs and 5,302 locomotives or 8.1 per cent in need of "running" repairs. During the first fifteen days in January, 21,004 locomotives were repaired and turned out of the shops, an increase of 1,203 compared with the last half of December.

The railroads on January 15 had 11,341 locomotives in need of repair or 17.6 per cent of the ownership, according to reports filed with the Car Service Division. This was an increase of 966 over the number in need of repair on January 1, at which time there were 10,375 or 16.1 per cent.

In accordance with the revised form whereby locomotives held for repairs are reported as between those needing classified or running repairs reports showed 6,138 locomotives or 9½ per cent of the ownership in need of classified repairs and 5,302 locomotives or 8.1 per cent in need of "running" repairs.

During the first 15 days in January, 21,004 locomotives were repaired and turned out of the shops, an increase of 1,203 compared with the last half of December.

Proposed Railroad Legislation Drags

WASHINGTON, D. C.

PROPOSED RAILROAD LEGISLATION, which a little while ago was expected to occupy so large a share of the attention of Congress at this session, continues to be obscured by the interest given to other subjects, and very little progress has been made by those who are anxious to change the present railroad laws, while speculation as to an adjournment of the present session about June 1 has already begun. A further step toward adding to the list of investigations on which the Senate is engaged was taken on February 1, when Chairman Smith, of the Senate committee on interstate commerce, reported favorably from the committee, with an amendment in the nature of a substitute, the resolution introduced by Senator Gooding of Idaho providing for an investigation regarding the money expended by railroads "for the purpose of creating public interest favorable to railroad sentiment." The new resolution, S. Res. 124, calls for an investigation by the Senate committee itself, or a sub-committee thereof, in addition to that which the Interstate Commerce Commission would be directed to make. It provides as follows:

"*Resolved*, That the Interstate Commerce Commission be, and is hereby directed to conduct an investigation, along such lines and with sufficient detail as to reveal clearly and accurately, the amount of money expended, and the account or accounts to which charged, during the period January 1, 1923, to January 31, 1924, by each common carrier, railroad or subsidiary, directly or indirectly, for the preparation and distribution of advertising matter, propaganda, or publicity in any form, either oral, written, or printed, through its officers, agents, or other agencies; and for any other methods calculated to mold public sentiment favorable to the railroads or any legislative matter, or to influence acts or decisions of legislative or administrative bodies or persons, or to secure the election or appointment of public officers.

"In its investigation the commission is directed to secure from each common carrier railroad a statement, covering the period named above, signed by its president and auditor, verified by oath, showing:

"(a) The amounts expended by the carrier or any of its subsidiaries, and the account or accounts to which charged, as compensation or expenses for any of its officers, agents, employees, or other persons or person while engaged as speakers or interviewing the public or public officials; for the publication and distribution or advertisements, magazines, books, pamphlets, newspaper articles and editorials, and any and all other literature concerning the operation, earning, expenditures, stock, valuation, investments, legislative, or educational matters.

"(b) The names and addresses of all associations, bureaus, institutes, committees, chambers of commerce, and other organization to which moneys have been paid or contributed, directly or indirectly, by the carrier or any of its subsidiaries, together with the amounts paid or contributed to each, and the purpose for which such payments or contributions were made.

"The commission is further directed to transmit its report to the Senate within ninety days after the adoption of this resolution.

"*Resolved further*, That the Committee on Interstate Commerce be, and is hereby, directed, either as a whole or by subcommittee, to investigate the extent, character, methods and purposes of propaganda emanating directly or indirectly from common carrier railroads or from associations, committees, bureaus, institutes, or other organizations receiving dues, fees, assessments, contributions, or other form of payment from such railroads, their subsidiaries, or any of them."

Senator LaFollette's resolution for an investigation of the settlements made by the Railroad Administration has not yet been acted upon, and there have been no visible signs of activity in the House committee on interstate and foreign commerce on the numerous railroad bills which have been referred to it. Chairman Winslow is supposed to be engaged in drafting some bills in accordance with the recommendations made by President Coolidge in his message.

Senator Gooding has introduced a bill, S. 2327, in addition to a resolution previously introduced on the same subject, to amend the fourth section of the commerce act. Sen-

ator Shields has introduced another bill, S. 2054, to lengthen the period in which suits for the recovery of overcharges may be instituted. Senator Smith has introduced a bill by request, S. 2318, to amend the locomotive inspection act. In addition to prohibiting the operation of unsafe locomotives the bill would increase the salary of the chief inspector of locomotives of the Interstate Commerce Commission to $7,500 a year, of each assistant chief inspector to $6,000 a year and of district inspectors to $3,600 a year. The bill also provides for an allowance of not exceeding $1,000 a year to district inspectors for office expenses, for the appointment of additional inspectors and for an increase in the appropriation for locomotive inspection to $500,000 a year.

Representative Oldfield has introduced a bill, H. R. 6539, to prohibit the collection of a surcharge in connection with the payment for parlor or sleeping car accommodations.

State Commissioners Present Views

The legislative committee of the National Association of Railroad and Utilities Commissioners, at a conference with Chairman Smith of the Interstate Commerce Committee of the Senate, on January 30 presented the resolutions adopted at the annual convention of the association held in Miami, Fla., December 4-7, 1923. These resolutions ask Congress to amend the Transportation Act in such manner as to restore to state authorities the same powers as to railroad rates and service, and as to the authorization of construction of new lines of railroad, and as to telephone companies that such authorities had before the Transportation Act was passed. The committee also presented to Senator Smith a statement of the position of the association upon the bill introduced by Senator Cummins dealing with railroad consolidations and federal incorporation, expressing the opposition of this association to the federal incorporation of railroads, as proposed in Senate Bill 2224. This opposition was previously expressed before the committee in a hearing on Extension of Time for Relinquishment by the Government of Railroads to Corporate Ownership and Control, on January 30, 1919, in a resolution set out on page 755 of the printed hearings. "This committee is of the opinion," they said, "that the prime purpose of federal incorporation is the destruction of the regulatory powers of the states, and that its ultimate effect will be the loss to the states of the revenues which they now receive from state taxation of railroads. We are opposed to it, and when the bill receives the consideration of your committee, we ask for opportunity to be heard."

Those present at the conference were H. G. Taylor of Nebraska, president; W. D. B. Ainey of Pennsylvania, vice-president and chairman of the executive committee; Charles Webster of Iowa, chairman of the legislative committee; Commissioners James S. Benn of Pennsylvania, John W. Raish of South Dakota, Frank W. Shealy of South Carolina, and O. O. Calderhead of Washington, and John E. Benton, general solicitor.

Effect of Rate Reductions

Among the data furnished to Chairman Smith of the Senate Committee by the Interstate Commerce Commission at his request is a statement showing the effect on the carriers' revenues of reductions of 33⅓ per cent and 20 per cent, respectively, in freight rates on products of agriculture. For the year ended September 30, 1923, the commission's Bureau of Statistics estimated the revenues of the carriers from grain, flour and meal, hay, other products of agriculture, livestock, poultry, eggs, butter and cheese and wool as $888,085,000, while 33⅓ per cent of this would be $296,028,000 and 20 per cent would be $177,617,000. The net railway operating income for that 12-month period, according to the monthly reports, was $776,666,000, and the net income above fixed charges, assuming 1922 other income and fixed charges was estimated at $371,256,000. The commission also furnished the following memorandum showing selected items of income, expense and traffic for the fiscal year, 1914, in comparison with the 12 months' period ended September 30:

CLASS I ROADS

Item	Eastern district	Southern district	Western district	Total United States
1. Average revenue per ton-mile *(mills)—				
1914	6.33	6.68	8.92	7.23
1923	10.98	9.50	12.25	11.11
Per cent of increase	73.5	42.2	37.3	53.7
2. Average revenue per ton—				
1914	$0.81892	$1.28948	$1.71051	$1.11720
1923	1.66769	2.08412	2.63289	2.00 80
Per cent of increase	103.6	61.6	53.9	79.2
3. Revenue ton-miles of freight traffic (millions)—				
1914	143,116	49,524	92,285	284,925
1923	195,937	81,128	136,358	413,423
Per cent of increase	36.9	63.8	47.8	45.1
4. Freight revenue (thousands)—				
1914	$905,279	$330,771	$823,842	$2,059,892
1923	2,151,038	770,578	1,670,862	4, 92,479
Per cent of increase	137.6	133.0	102.8	122.9
5. Passenger-miles (millions)—				
1914	16,349	4,585	13,633	34,567
1923	19,169	5,382	13,151	37,702
Per cent of increase	17.3	17.4	d 3.5	9.1
6. Passengers carried (thousands)—				
1914	608,647	121,873	271,830	1,002,350
1923	654,516	114,812	216,395	985,722
Per cent of increase	7.5	d 5.8	d 20.4	d 1.7
7. Pullman passengers†				
1914	.....	.....	.....	26,188,753
1923	.....	.....	.....	33,926,403
Per cent of increase	.....	.....	.....	29.5
8. Passenger revenue of railroads (thousands)—				
1914	$293,419	$99,254	$291,076	$683,749
1923	545,539	181,162	411,906	1,138,608
Per cent of increase	85.9	82.5	41.5	66.5
9. Labor compensation in operating expenses‡ (thousands)—				
1914	$579,865	$192,816	$477,736	$1,250,417
1923	1,312,941	462,963	1,031,946	2,807,851
Per cent of increase	126.4	140.1	116.0	124.6
10. Fuel charged to operating expenses (thousands)—				
1914	$102,059	$31,773	$101,400	$235,231
1923	255,750	89,104	217,685	562,539
Per cent of increase	150.6	180.4	114.7	139.1
11. Materials and other operating expenses (thousands)—				
1914	$338,877	$117,252	$261,647	$717,776
1923	762,915	238,421	524,893	1,526,229
Per cent of increase	125.1	103.3	100.6	112.6
12. Railway tax accruals (thousands)—				
1914	$55,732	$19,000	$60,840	$135,573
1923	133,102	52,559	139,206	324,867
Per cent of increase	138.8	176.6	128.8	139.6
13. Interest of funded debt (thousands)—				
1914	$128,742	$65,143	$179,411	$373,296
1922§	174,304	76,456	207,112	457,872
Per cent of increase	35.4	17.4	15.4	22.7
14. Dividends declared (thousands)—				
1914	$116,048	$33,327	$226,724	$376,099
1922§	87,874	40,986	142,714	271,574
Per cent of increase	d 24.3	23.0	d 37.1	d 27.8

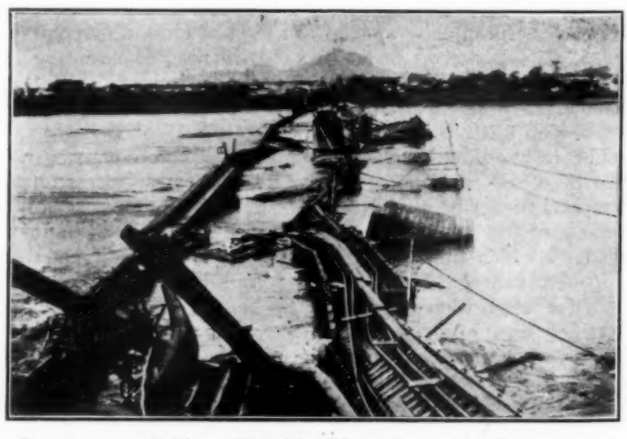
*The average revenue per ton-mile does not precisely show the change in rates, because of changes in proportions of traffic and in average haul. The general rate increases since June 30, 1914, increased the rate level 90 per cent in the Eastern "group," 52 per cent in the Middle West, and 40 per cent in the South and Far West. But there are exceptions to these general increases.

†One report is filed by Pullman Company for its mileage in United States. Separation by districts is not available.

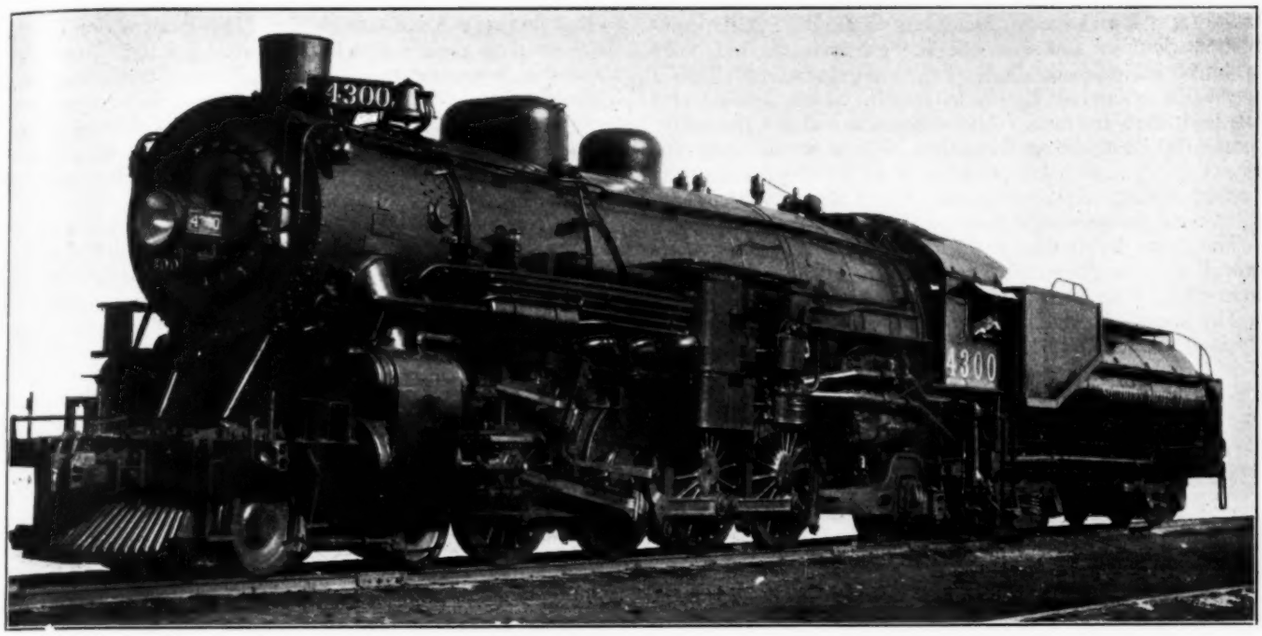
‡Estimate for pay roll chargeable to additions and betterments excluded.

§Calendar year 1922 data used because 1923 reports are not available.

d Decrease.



Banyugawa Bridge, Tokaido Line, Japanese Government Railways, After the September Earthquake



The Locomotive that Makes the 815-Mile Run

Heavy 4-8-2 Type Southern Pacific Locomotives

Designed To Haul Twelve Passenger Cars on Two Per Cent Grades and Run 815 Miles

EARLY IN THE YEAR 1921 the Southern Pacific placed in service a number of powerful 4-6-2 type locomotives* that hauled 11 heavy passenger cars on a 1.5 per cent grade and established a record for long locomotive runs. These locomotives have been regularly hauling passenger trains between Ogden, Utah, and Sparks, Nev., a distance of 536 miles, and have averaged better than 10,000 miles per month, fully meeting the expectations of the Southern Pacific in adopting a longer stroke for superheated passenger locomotives, thus keeping down cylinder clearances and obtaining a more economical steam consumption. In this respect, the Southern Pacific has taken the lead.

This company has recently made another advance by placing in service ten 4-8-2 type locomotives to haul their heavy passenger trains between Los Angeles, Cal., and El Paso, Tex. These locomotives were especially designed for this long run over that difficult mountain and desert territory, a distance of 815 miles, which is made without changing locomotives, thus establishing a new record for long locomotive runs. It is anticipated that these locomotives will average about 12,000 miles per month.

The general design and specifications for these locomotives were worked up under the supervision of George McCormick, general superintendent motive power, and Frank E. Russell, assistant mechanical engineer, the design being completed and details worked out with the American Locomotive Company which built the locomotives. The outstanding characteristics sought in this design were maximum tractive power within the weight limits and ample boiler capacity for the long sustained runs. This required refinement in design to provide ample strength with minimum weight necessitated the use of materials of high tensile strength for many parts.

*For a description of these locomotives see *Railway Age*, July 2, 1921, page 15.

The character of the territory over which these locomotives are operating is shown on the accompanying profile. Grades of 2 per cent occur from Colton to Beaumont going east and from Indio to Beaumont going west. Also, from Tucson to Dragoon going east there are grades of 1.5 per cent. Previously the through passenger trains were hauled over the districts which have the heaviest grade by 2-8-2 type locomotives, and by 4-6-0 type locomotives and 4-6-2 type locomotives where the grades are lighter. With trains varying from 8 to 12 cars, the time card calls for schedules for Sunset Limited trains of 24.2 miles per hour from Colton to Beaumont and of 26.2 miles per hour from Indio to Beaumont. From Tucson to Dragoon the schedule is about 30 miles per hour. Most of the remaining portions of the line consist of grades of approximately one per cent, the schedules varying from 38 to 42 miles per hour. It is expected that the new 4-8-2 type locomotives, which have a high sustained steaming capacity, will bring the maximum and minimum operating speeds nearer to the average, which will materially reduce the maintenance costs of both locomotives and track.

These 4-8-2 type locomotives have a total weight of 368,000 lb., of which 246,000 lb. are on the drivers. The maximum tractive force is 67,660 lb. with the booster, and 57,510 lb. without the booster, the ratio of adhesion for the drivers being 4.28. Using Cole's ratios as a basis of comparison, they have a maximum cylinder horsepower capacity of 2,965 and a boiler capacity of 103.4 per cent, including the increase obtained by the use of the feedwater heater. This high percentage of boiler capacity indicates that the boiler can supply the cylinders at high speeds without forcing. The boiler was designed with the largest proportions possible to obtain ample steaming capacity and, at the same time, to keep the wheel load on the track within safe limits. It is conical in form with an inside diameter of 82 7/16 in.

at the front barrel course, increasing to 93¼ in. at the combustion chamber course. The firebox measures 121 1/16 in. by 90 in. inside of sheets at the mud ring and includes a combustion chamber 75 in. in length, which provides for tubes 21 ft. 6 in. long. The steam space above the crown sheet is 30 in. at the back end and 25¼ in. at the front end. The Type A superheater consists of 45 units with a superheating surface of 1,162 sq. ft. The firebox is fitted with F.B.C. welded universal sleeves and reduced body staybolts.

The steam distribution is controlled by 14-in. piston valves propelled by a direct Walschaert gear. The valve gear is controlled by an Alco power reverse gear.

The frames, as well as all other castings subjected to heavy stresses, are made of high grade cast steel, thus permitting considerable reduction in weight. They are unusually well braced throughout. The driver brake cylinders are secured to the main frames just back of the steam cylinders and placed in a horizontal position, thus relieving the frames of unnecessary stresses due to braking. The rear section is a Commonwealth Steel Company's cradle casting, the front end of which is so designed that the trailing truck can be dropped down without moving the truck back. This facilitates making repairs to the booster.

One of the outstanding features in the design of this locomotive is what has been accomplished in obtaining increased tractive effort without increasing the stresses set up in the track and roadbed. To accomplish this, the engine is equipped with a constant-resistance centering device. Also, the forward pair of drivers is fitted with the Franklin lateral motion device, thus making ample provision for the engines to take curves with a minimum stress in the track. These centering devices also hold the engine steady on a tangent track, reducing to a minimum the lateral movement due to the steam action.

In order to keep down the dynamic augment to a minimum, the engine is equipped with connecting rods of normalized carbon Vanadium steel of I-section, hollow piston rods and Z-type pistons, thus providing light reciprocating parts, 50 per cent of which are balanced. The total weight of the reciprocating parts is 1,830 lb., or one pound to each 201 lb. of the total weight of the locomotive in working order as compared with the ratio of 1 to 160, which is considered good practice.

Special materials were used in parts subjected to heavy stresses as follows:

QUENCHED AND TEMPERED STEEL

Tensile strength 85,000 lb. per sq. in.

Crank pins	Driving axles
Main crank pins, hollow bored	Engine truck axles
Piston rods, hollow bored	Trailing truck axles

NORMALIZED CARBON-VANADIUM STEEL

Tensile strength 90,000 lb. per sq. in.

Main and side rods

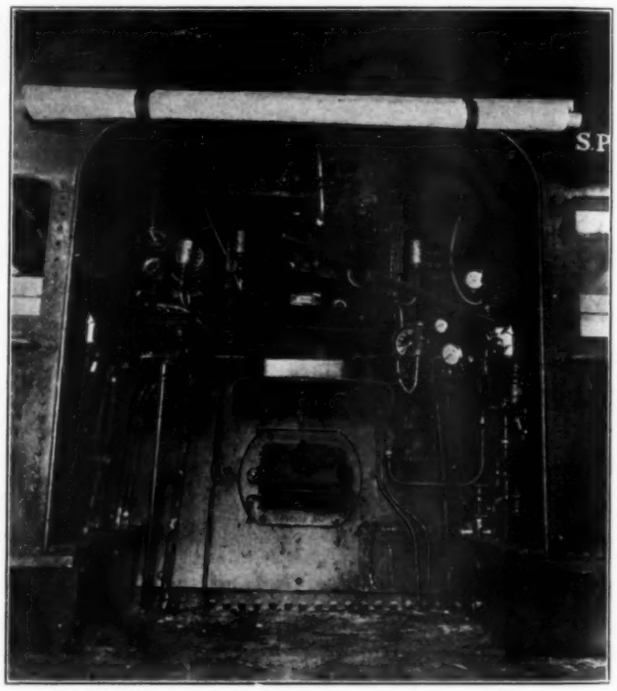
SPECIAL GRADE CAST STEEL

Tensile strength 75,000 lb. per sq. in.

Main frames	Lateral motion driving box, spacer and rocker
Frame crossties	Engine truck swing frame, etc.
Frame filling castings	Driving spring stirrups
Driving and trailing wheel centers	Guide yokes
Driving and trailing boxes	Spring saddles
Pedestal caps	Reverse shaft bearings
Pistons	Link supports and cheeks
Cylinder heads	Bumper bracket
Back steam chest heads	Engine truck center plate
Crossheads	

The cylinders follow the American Locomotive Company's light design, except that the exhaust passages have been enlarged considerably above those which are in general use. The size of the opening at the top of the saddle is 12 in. by 7 in., providing unrestricted exhaust passages up to the exhaust nozzle. The exhaust stand is secured by twelve 1⅛-in. tee-head bolts. The exhaust passages of the cylinders are extended 4 in. above the cylinder saddle and provided with a 1⅛-in. flange, well reinforced with ribs, extending down to and joining the cylinder saddle. This construction eliminates troubles experienced in maintaining a tight joint, the absence of which interferes with the draft of the locomotive. The cylinders provide for outside steam pipes and connections for superheated steam to the booster and exhaust steam to the feedwater heater. The depth of the casting over the frame section gives a very strong construction with minimum weight.

The smokestack is a new design of the railroad company. It consists of four iron castings, assembled in such a manner that the extension of the stack in the smokebox can be easily and quickly removed. The castings forming the extension, which are most subject to wear, can be replaced by new castings with very little trouble and without disturbing the alinement of smokestack and base. The casting forming the lower portion of the extension is so designed that the height of the bell above the exhaust nozzle may be increased or decreased to give the best draft conditions. This feature also makes the stack applicable to a number of other types of locomotives.



The Cab Is Short, Compact and Well Arranged

The journal bearings throughout are unusually large, especially the main, which is 13 in. in diameter by 22 in. long. The frame brace crossties forming the extended pedestals for the main driving boxes are of high grade cast steel and, in addition to being well secured to frame pedestals, are tied together, top and bottom, by supplementary pedestal binders, which add much to the rigidity of the pedestals and prevent journal bearings and axle from wearing conical.

The Franklin Railway Supply Company's Locomotive Booster, Type C-1, is applied, the steam supply for which is taken from the steam chest of the main cylinders instead of from the steam dome. Superheated steam is thereby used in place of saturated steam, reducing steam consumption for the operation of the Booster engine.

It is interesting to note that the spring rigging has been constructed to incorporate bent equalizers similar to those used on the Southern Pacific 2-8-0 type locomotives, which were placed in service some 20 years ago. This design of equalizer provides a more stable construction by keeping the

spring rigging lined up, particularly on 4-8-2 type locomotives. On lighter power this type of equalizer is not so essential and the advantage of its use has for some time been practically overlooked. The Southern Pacific has again brought this design into use by installing the bent equalizers on their 4-8-2 type locomotives, which will obviate the trouble ordinarily experienced with the spring rigging on this type of locomotive.

The Westinghouse No. 6 ET brake equipment is applied, the air being supplied by one 8½-in. cross-compound compressor. The application of brakes to the trailing truck wheels brings the braking power of these locomotives up to the maximum, since this results in all the wheels of the locomotive being equipped with brakes. Clasp brakes are used on the tender truck wheels.

A flange lubricator is applied, which provides lubrication for the flanges of the front driving wheels. The oil reservoir is located on the left side of the smokebox, where the crude oil used is sufficiently heated to run through piping leading to the front driving wheel flanges, the flow being regulated by needle valves. Flange oilers are also applied to the trailing wheels.

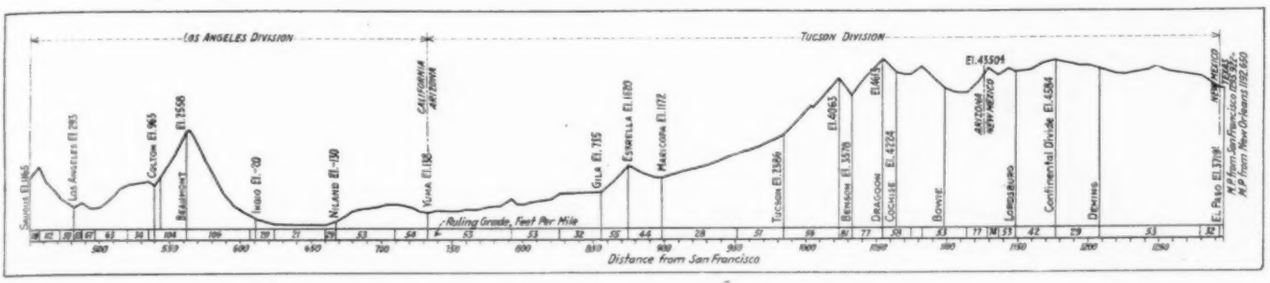
Another source of reduction in weight without sacrificing strength is in the application of a shorter and somewhat narrower cab. By placing the steam turret on the outside of the cab at front, it was possible to make a material reduction in the length of the cab. By eliminating the two doors at the front, which with large size boilers have, of necessity, always been made so narrow as to be very impractical, the width of cab has also been decreased. However, a window at the front on each side has been applied. The saving in weight on account of the application of the smaller cab amounts to about 200 lb. To take the place of cab doors, the steel floor of the cab has been extended 5 in. out beyond each side of the cab to be used as a running board and handholds have been conveniently located near the eaves to enable enginemen to pass around outside of the cab to and from the running boards at front. This extra width of cab floor dispenses with the use of supplementary running boards, located just below the cab floor, which is the practice on many roads for large power. A further saving of 300 lb. is thus effected. Moreover, for convenience of the enginemen, the blow-off cocks are operated by means of two levers located in the cab, one on each side.

The illustration of the fixtures in the cab shows that the Southern Pacific has been giving special attention to the arrangement of cab fixtures and operating levers, as the satisfactory and economical operation of powerful locomotives depends upon the convenient location of gages and controlling devices. Extension handles are applied to all valves on the top of the boiler head in inaccessible places, and arranged in convenient locations. They are supported by a wrought iron bracket secured to the roof of the cab, the bracket carrying an aluminum name plate having the name of each control handle stamped in ¾-in. letters.

The feedwater is supplied by one Worthington combined feedwater heater and a pump of 7,200 gal. capacity per hour, placed on the left side and by one Nathan non-lifting injector, placed on the right side, the latter being used only in cases of emergency and when the locomotive is not working.

The tender is of the Vanderbilt type, carrying 4,000 gal. of oil and 12,000 gal. of water. The tank is carried on a Commonwealth cast steel frame, made in one piece with the bumpers and the transverse bolsters, which serve as tank supports. The trucks are of the Commonwealth design, with cast steel frames and swing bolsters. This is an equalized pedestal type of truck, fitted with both helical and triple elliptic springs. Side bearings are used on the rear truck only.

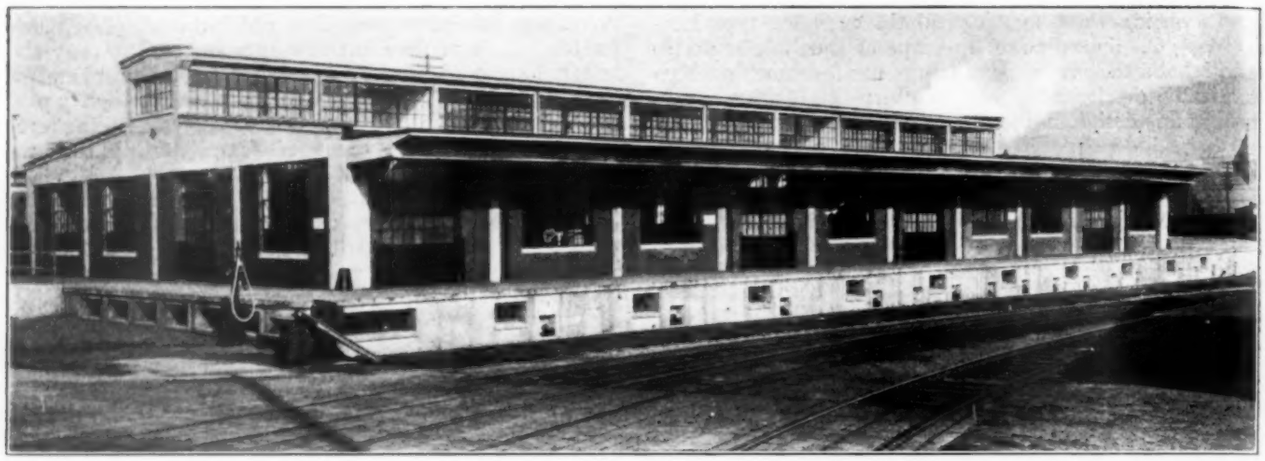
The principal dimensions, weights and proportions of these locomotives are given in the accompanying table.



Profile of Southern Pacific Between Los Angeles and El Paso, Where Run of 815 Miles Is Made

TABLE OF DIMENSIONS, WEIGHTS AND PROPORTIONS

Railroad	Southern Pacific
Type of locomotive	4-8-2
Service	Passenger
Cylinders, diameter and stroke	28 in. by 30 in.
Valve gear, type	Walschaert
Valves, piston type, size	14 in.
Weights in working order:	
On drivers	246,000 lb.
On front truck	61,500 lb.
On trailing truck	60,500 lb.
Total engine	368,000 lb.
Tender	226,900 lb.
Wheel bases:	
Driving	20 ft. 0 in.
Rigid	13 ft. 0 in.
Total engine	42 ft. 3 in.
Total engine and tender	83 ft. 6 in.
Driving wheels, diameter outside tires	73 in.
Boiler:	
Type	Conical
Steam pressure	210 lb.
Fuel	Oil
Diameter, first ring, inside	82-7/8 in.
Firebox, length and width	121 1/8 in. by 90 in.
Combustion chamber length	75 in.
Tubes, number and diameter	223—2¾ in.
Flues, number and diameter	45—5½ in.
Length over tube sheets	21 ft. 6 in.
Grate area	75.7 sq. ft.
Heating surfaces:	
Firebox and comb. chamber	350 sq. ft.
Tubes and flues	4,201 sq. ft.
Total evaporative	4,551 sq. ft.
Superheating	1,162 sq. ft.
Comb. evaporative and superheating	5,713 sq. ft.
Special equipment:	
Brick arch	Yes
Superheater	Type A
Feedwater heater	Worthington
Booster	Yes
Tender:	
Style	Vanderbilt
Water capacity	12,000 gal.
Oil capacity	4,000 gal.
General data estimated:	
Rated tractive force, 85 per cent	57,510 lb.
Rated tractive force with Booster	67,660 lb.
Cylinder horsepower (Cole)	2,965
Boiler horsepower (Cole) (est.)	3,067
Weight proportions:	
Weight on drivers ÷ total weight engine, per cent	66.8
Weight on drivers ÷ tractive force	4.28
Total weight engine ÷ cylinder hp	124
Boiler proportions:	
Boiler hp. ÷ cylinder hp., per cent	103.4
Comb. heat surface ÷ cylinder hp	1.93
Tractive force ÷ comb. heat. surface	10.07
Tractive force × dia. drivers ÷ comb. heat. surface	.736
Cylinder hp. ÷ grate area	39.2



The New Reading Company Oil House at Reading, Pa. The Storage Tank Filling Connections Are Shown in Recesses Under the Platform

The Reading Builds Model Oil Storehouse

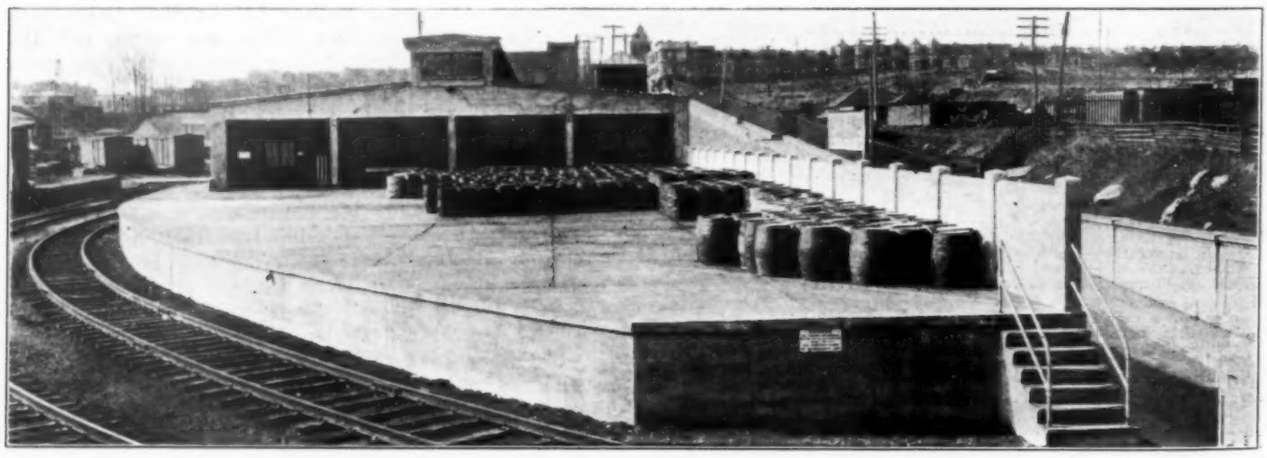
Fireproof Structure, Well Lighted and Ventilated, Completely Equipped with Modern Facilities

ONE OF THE MOST MODERN and completely equipped oil storehouses in America has just been completed and put in operation by the Reading Company at Reading, Pa. The building is constructed of reinforced concrete, steel and brick, making it entirely fireproof. It is 75 ft. wide by 150 ft. long and contains one story and a basement. A platform 3 ft. 9 in. above the top of the rail with a total area of 6,624 sq ft., adjoins the building on one side and the two ends. On the west end and south side of the building it is 10 ft. wide. At the rear, or east end, it is triangular in shape, tapering from a width of 80 ft. at the building to 16 ft. wide at the extreme end, 138 ft. from the building. This end platform is used for storing empty barrels and is laid out with 2-in. painted lines, into spaces which are stenciled to designate the kinds of barrels to be placed in them. A ramp leads from the ground on the west end of the building to the platform, for the use of electric trucks.

The loading and unloading track on the south side of the building will hold seven cars. The storage tank filling connections are located in recesses under the platform, which are clearly shown in one of the illustrations.

The basement extends out beneath the front and west end platforms and is 85 ft. wide by 160 ft. long. A room along the south side, adjoining the unloading track, 40 ft. wide by 155 ft. long and 13 ft. high in the clear, accommodates 12 large rectangular tanks with a capacity of from 10,000 gallons to 16,000 gallons each. A 10-hp. motor is provided to operate an agitator. An open duct and drain, 5 ft. wide by 2 ft. 6 in. deep, runs the full length of the building just back of the tanks. In addition to providing for drainage and pipe lines, it is also equipped with a narrow gage track on which is operated a steel car with a tank, which may be placed opposite any of the tanks when cleaning them out. Concrete pillars, 12 in. above the level of the floor, provide sufficient place under the tanks for steam radiators and pipe lines. The oil from cars runs into storage tanks by gravity.

The north half of the basement has a clear height of 9 ft. and is divided into five rooms. The east room, containing 24 tanks ranging in capacity from 120 gallons up to 1,500 gallons, is 41 ft. by 43 ft. Four agitators operated by a 5-hp. motor are provided on four of the tanks. An oil filter is also located in this room.



The Empty Barrel Storage Platform at the East End of the Building

The Barrel Storage Room—Light and Ventilation Are Provided by the Clerestory

Adjoining this room on the west is a barrel room, 34 ft. by 73 ft. with entrance from the main floor above by stairway and electric elevator. The elevator has a capacity of 4,000 lb. and is used in hoisting the barrels to and from the main floor. A small space, 15 ft. square, in this room is provided with a compounding tank 4 ft. 6 in. wide by 8 ft. long by 3 ft. deep, for use in manufacturing soft soap, disinfectant and car cleanser.

The room next adjoining measures 14 ft. by 34 ft. and is used for cleaning and storing cans. The room at the west end of the basement is 23 ft. wide by 34 ft. long. Here rod cup grease is molded and stored for use. A stairway leading from this room to the platform on the outside of the building has been provided in order to avoid going through to the other end of the building to reach the first floor.

On the east end of the main floor, adjoining the barrel storage platform, a room 43 ft. wide by 74 ft. long, contains 24 hand pumps of five gallons capacity each, with two extra or emergency hand pumps of the same capacity; five power pumps, each with a capacity of 40 gallons per minute, and one extra or emergency power pump; one 6,000-lb. capacity scale for general use, and one 12,000 lb. capacity scale under the compounding oil tank, which is 6 ft. 1 in. wide by 7 ft. 7 in. long and 3 ft. 9 in. deep. This room also contains four journal packing tanks 8 ft. 4 in. by 8 ft. 4 in. by 2 ft. 9 in. deep, three of which are used for freight car and one for coach packing. Outside of this room under the concrete platform are located two circular tanks of 10,500 gallons capacity, each, both containing engine gasoline, and one of 500 gallons capacity with 88 deg. gasoline.

The center room, used for barrel storage, is 72 ft. wide by 73 ft. long, with a 12-ft. by 12-ft. space for toilets and wash bowls. This room also contains the 10-ft. by 10-ft. enclosed electric elevator shaft. The floor of this room is marked off with two-inch white lines, with proper stenciling, into spaces reserved for the various classes and grades of oil that are stored in barrels.

A 28-ft. by 66-ft. room at the west end of the building is separated by a fire wall from the adjoining barrel room. This is used for the storage of waste.

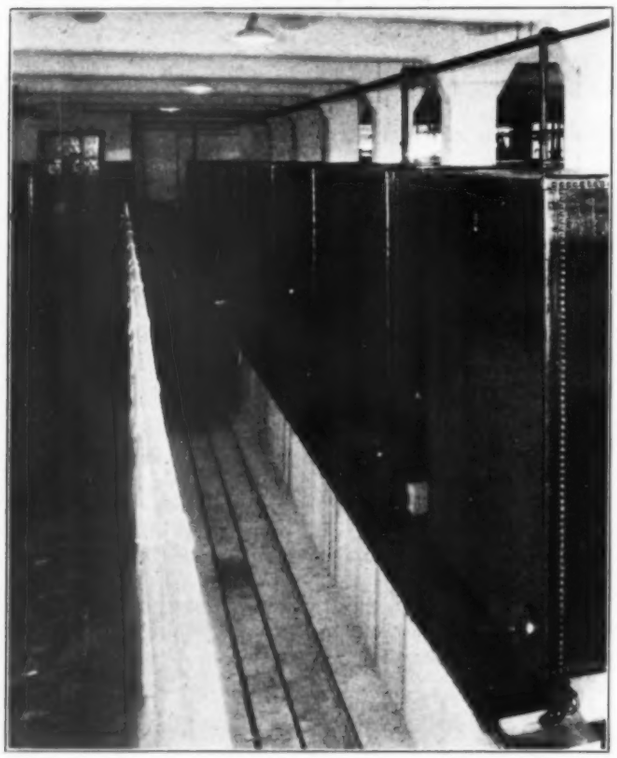
The Pump Room at the East End of the Building; Journal Box Packing Tanks at the Left

Along the driveway at the west end of the building, a 500-gallon gasoline tank with an outside pump is provided for the use of the company's motor trucks.

A commodious skylight extends the full length of the building, providing ample light and ventilation. The building is equipped throughout with electric lights and with steam, water and air lines, all of which are painted in distinguishing colors as shown below:

All oil tanks	Black
All oil pumps (including power pumps)	Olive green enamel
All oil filling lines and drip return lines	Black
All oil tank vent lines	Black
All oil suction lines	Red
All oil pump delivery lines in basement and pump room	White
Outside gasoline pump	Red enamel
Compressed air lines	Bright green
Water lines	Yellow
Steam radiators and piping	Navy gray

It is anticipated that, with this modern building and its facilities, the stores department will eliminate leakage and tank waste and at the same time insure to users good clean oil



The Storage Tanks Are in the Basement

with a maximum service at a minimum cost. It will also facilitate the release of tank cars more promptly. A tank car of heavy oil can be unloaded in a few hours and a tank car of kerosene in less than an hour, enabling the oils to be unloaded in the morning, a shift made and the cars placed for shipment before noon. In filling or drawing there is no waste of oil, the drip from the pumps going back into the tanks. The filling of barrels is accomplished rapidly, with an exact check on the amount required and shipped. This will assist in avoiding differences in the oil accounts.

Plans for the building were drawn and the construction carried out under the supervision of S. T. Wagner, chief engineer of the Reading Company. The equipment layout and installation of steam, water and air lines was under the direction of C. A. Bingaman, mechanical engineer. The contractor was Robert E. Lamp & Company, Philadelphia, Pa. The equipment, consisting of the tanks, pumps, etc., was furnished and installed by the Tokheim Oil Tank & Pump Company, Fort Wayne, Ind.

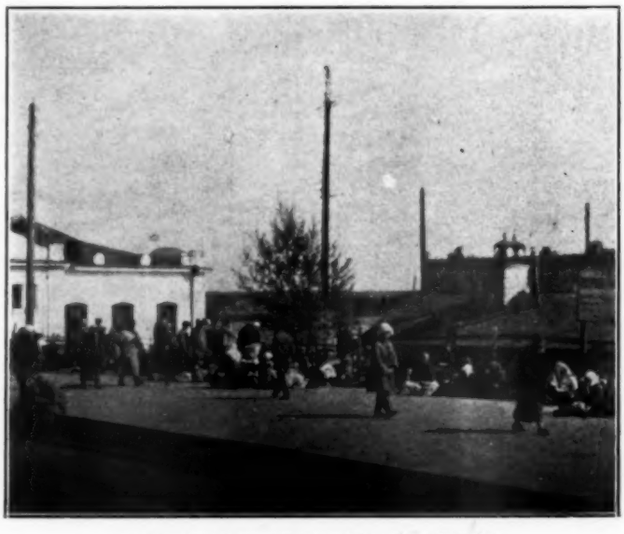
Detecting Flaws in Iron and Steel

RAPID DEVELOPMENTS have been made recently in effecting practical methods for determining the character of iron and steel by magnetic test. The method cannot be used as a substitute for chemical analysis, but disclosures just made by Dr. Chas. W. Burrows indicate that it will find extensive commercial application. The Pennsylvania and the New York Central, in conjunction with the Bureau of Standards and the American Society for Testing Materials, have taken a part in the development work.

Dr. Burrows was formerly in charge of the magnetic section of the U. S. Bureau of Standards and is now associated with the Burrows Magnetic Equipment Corporation, Jersey City, N. J., a subsidiary of the Federated Engineers Development Corporation. Magnetic analysis as demonstrated by Dr. Burrows is particularly useful for comparing the quality of pieces of metal of uniform size and shape with a standard piece of known quality. In this way slight differences in heat treatment or quality can be detected. The operation is a simple one which can be applied semi-automatically without the aid of technical experts. Similarly, variations in the character of metal in spots in long pieces of uniform section, such as a rail, can be detected with great accuracy. In making these tests, it is necessary that the cross section of the pieces tested be uniform, but slight variations in commercial shapes will not affect the value of the test.

Following a slightly different method of procedure, an arbitrary standard or scale can be set up and the degree of hardness of a number of pieces of metal can be compared, even though the sections may vary considerably.

Up to date, commercial applications have been limited to a machine which has been used for two years by the General Electric Company for testing steam turbine bucket discs, a machine which is about to be delivered to the Hyatt Roller Bearing Company for testing bearing stock and a machine ordered by the Ford Motor Company for testing automobile bevel ring gears. The General Electric machine has demonstrated its value and the purchase of the other two may be considered an indication of faith in the success of the method. The value of such a method as applied to the testing of rails, wheels or boiler plates for flaws, axles for degrees of heat treatment or flaws, staybolt iron for uniformity, etc., is obvious.



A Typical Crowd at a Russian Station

A Typical Tow on Mississippi River, Showing Barges Grouped About Towboat

Federal Barge Line Proving Costly Experiment

Mississippi-Warrior Service an Unprofitable Venture, Although Handling Capacity Traffic

THE VALUE of inland waterway transportation, both as a commercial venture and as a public benefit, has been a question of wide-spread interest in the United States for years. Proponents and opponents have found it easy to praise or to condemn because of a lack of facts based on actual experience. It is, therefore, of particular value to note the results of the first effort, on a well-financed and adequately large scale, to operate a barge line on our greatest river, the Mississippi. While it has had many advantages which would not be available to a privately-owned line, the results which are being secured by the Mississippi-Warrior Service will serve to a great extent to demonstrate the economic value, or lack of it, of river transportation.

The Mississippi-Warrior Service, the federal barge line operated by the War Department of the United States between St. Louis, Mo., and New Orleans, La., on the Mississippi river and between Cordova, Ala., and New Orleans, on the Warrior river, via Mobile and the Gulf of Mexico, was inaugurated in July, 1918, as an emergency measure due to war-time conditions. A special committee on inland waterways at that time submitted a report to the director general of railroads recommending that a fleet be established on the lower Mississippi river at a cost of $8,200,000, and that another fleet be developed to operate on the canalized portion of the Black Warrior and Tombigbee rivers in Alabama, at a cost of $3,000,000, to provide service between the Birmingham coal and iron districts and the ports of Mobile and New Orleans.

Original Plant and Earnings

On July 11, 1918, M. J. Sanders was appointed federal manager of the Mississippi-Warrior River Service and instructed to commandeer all available existing equipment on the two waterways capable of being used for the transportation of freight and also to proceed with the construction of a new fleet authorized by the director general. On the Mississippi, 20 steel, flat-deck barges belonging to the United States engineers were chartered and temporary cargo houses were erected on them capable of carrying about 450 tons of freight each. A part of the fleet of the Kansas City-Missouri River Transportation Line, consisting of two 1,000-ton barges, three 600-ton barges and two small tow boats, was purchased. In addition, two tow boats belonging to the United States engineers were chartered and one belonging to a river operator was leased.

In spite of the disadvantages under which the line was operating, particularly lack of power and inadequate terminal facilities, the traffic carried during the first year resulted in average gross earnings of $3.71 per ton. Downstream traffic aggregated 63,698 tons, or 87.8 per cent of the deadweight capacity of the fleet, while the lading upstream was 28,482 tons or 52.7 per cent of the deadweight capacity.

On the Warrior river, transportation service, limited at the beginning to the handling of coal, was established between the Birmingham coal district and Mobile and New Orleans in December, 1919, with six steel, self-propelled deck barges, three tow boats and 25 wooden coal barges which had been purchased from coal companies and transportation lines. Later, 25 additional coal barges were constructed and one tow boat belonging to the United States engineers was chartered. During the first year of operation, this fleet carried in excess of 100,000 tons of coal, as well as timber and steel for export.

In spite of the extraordinary amount of traffic routed via the Mississippi river line on account of the scarcity of other transportation, a net loss of $422,168.05 was accumulated during the period from September, 1918, to June 30, 1919, when the total operating expenses were $702,-821.36 and the total operating revenues only $277,453.68. During the same period, the Warrior river section accrued a deficit, after deductions for rents, of $61,469.19, its operating expenses being $149,681.61 and its operating revenues $99,685.30. In studying these figures it should be understood that no fixed charges are included in the

barge line's expenses corresponding with those which the railroads must meet. Surplus earnings, if any, are turned over to the Treasury Department, but no obligation exists.

Improvement in Financial Condition

This unsatisfactory condition was due chiefly to the fact that operations were being carried on with a plant so inadequate as to be entirely incapable of efficient use. Since the beginning, however, the line has been developed physically as fast as possible with the result that its financial condition, until last year, has improved fairly steadily. Most of these improvements have been made under the direction of Theodore Brent, who is now federal manager and traffic manager. During the fiscal year ending June 30, 1922, the Mississippi river section recorded the first net income, amounting to $21,027.06. In the fiscal year ending June 30, 1923, however, another loss was registered. Operations during the period from July 1, 1922, to December 31 resulted in a loss of $638,429.39, which greatly exceeded the net income of $13,632.77 earned in the six-months period from January 1, 1923, to June 30, and which caused a net loss of $624,796.62 for the fiscal year. This was due to low water in the Mississippi river which brought the operation of the line to a standstill, and a falling-off in foreign trade.

The Federal line's bid for traffic is based almost entirely upon its rates, which are approximately 80 per cent of the corresponding rates by rail. It offers universal through bills-of-lading with freight fully insured, as provided in lading form. Sailings are made from each terminal at intervals of approximately six days, the schedule from St. Louis to New Orleans averaging 10 days down-stream and 17 days up-stream. On the Warrior division the schedule from New Orleans to Mobile is two days; to Demopolis, three days; to Tuscaloosa, four days; and to Cordova and Birmingport, Ala., five days.

Equipment and Terminals

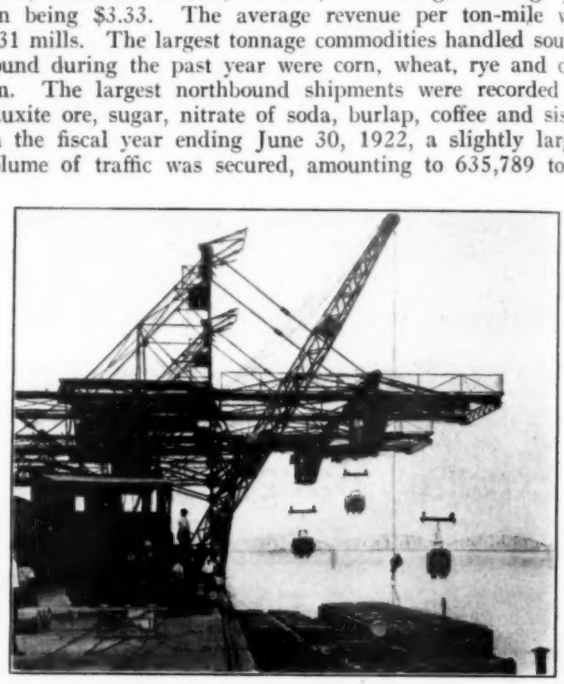
On the Mississippi river section, there are now in service 18 tow boats, 45 steel cargo barges and 31 pieces of incidental floating equipment. The tow boats are of both the turret wheel and twin-screw types, the newer models being twin-screw, tunnel-stern boats, which are more powerful and more efficient in operation in shallow water. The steel barges are 45 ft. wide, 232 ft. long and 17 ft. deep, 9 ft. being under-deck and 8 ft. over-deck. They are divided into eight water-tight compartments with two decks, upper and lower, each 30 ft. wide.

On the Warrior river, the fleet consists of 6 tow boats, 4 self-propelled barges, 53 cargo barges, 2 tugs and 2 crane barges for transferring coal in Mobile harbor. Their operation is greatly handicapped, however, by the fact that they draw more water under full load than is ordinarily available in the river.

Freight terminals are owned or leased by the service at Memphis, and Vicksburg, Tenn., Cairo, Ill., St. Louis, Mo., and Mobile, Cordova, Tuscaloosa and Demopolis, Ala. The terminals are furnished the service by the government, and their initial cost is not charged to the barge line's account. At Memphis, a new rail and river terminal is now in operation, the original unit having been enlarged at a cost of $1,000,000. At the Memphis terminal, there is a crane barge with a 75-ft. boom of 20-ton capacity and car floats and transit sheds at the edge of the river below the bluffs. A double track railway with a 3½ per cent grade is laid down an incline from the top of the bluff to the edge of the river, a trestle at the bottom enabling freight to be handled in high or low water. The car floats are 270 ft. by 56 ft. and each has three tracks with a total capacity of 36 cars. This use of an incline adjustable to the height of the river, with loading floats, is in common use in the newer terminals of the service. At the South St. Louis terminal conveyor belts on endless chains are used to haul trucks up the inclined bridges.

Traffic Figures

The traffic carried during the fiscal year ending June 30, 1923, amounted to 595,115 tons, the average earnings per ton being $3.33. The average revenue per ton-mile was 3.31 mills. The largest tonnage commodities handled southbound during the past year were corn, wheat, rye and cotton. The largest northbound shipments were recorded in bauxite ore, sugar, nitrate of soda, burlap, coffee and sisal. In the fiscal year ending June 30, 1922, a slightly larger volume of traffic was secured, amounting to 635,789 tons.



Loading Barges at Market Street Dock, St. Louis, Mo.

During the fiscal year ending June 30, 1923, the freight revenues of the Mississippi river section amounted to $1,983,884.30 and miscellaneous transportation revenue, $21,179.65. Revenue from operations other than transportation amounted to $10,877.69, making, with charter revenues of $210, the total operating revenues for the period $2,016,151.64.

The operating expenses, which totaled $2,634,644.99 for that period, were divided as follows: Maintenance of equipment, $661,533.61; maintenance of terminals, $131,255.88; traffic solicitation expenses, $130,792.52; operation of vessels, $660,935.69; operation of terminals, $903,069.33; incidental transportation expenses, $48,182.91; general expenses, $82,765.05, and charter expenses, $16,110.00. The average expense per ton of handling the line's traffic in 1923, including depreciation was $4.43, $1.10 more than the average earnings per ton.

Through joint rates now in effect, the Mississippi-Warrior service is able to compete with railway lines on interline as well as local shipments. The usual 20 per cent reduction from the rail rate between the points served by the river service is offered. These joint rates did not become effective until the latter part of December, 1919, and since that time extension of the territories to which they apply has been steady. All commodities except live stock and perishable freight are accepted for shipment.

Freight Handling Methods

The method used in the loading and unloading of freight at the terminals is unique on account of conditions resulting from the rise and fall of the water line of the rivers. Although the practices vary at certain of the terminals, due to local conditions, the method in use where possible at the newer terminals is to load and unload through a floating

terminal barge or car float. This barge, which rises and falls as the depth of the river changes, is commonly connected with the mainland by a two-track incline over which the freight cars are shunted into the car float, the tracks in the car float being depressed so that the door sills are on a level with the car float platform.

Barges to be loaded or unloaded are brought up alongside the car float and made fast with the doors of their cargo compartments in a line with the car float doors, exactly as freight cars are spotted alongside freight houses on the railroads. The cargoes are then transferred, either on hand trucks or by means of gantry cranes. By fixing barges abreast of one another alongside the car float and laying bridges across the gaps between their platforms, two and even three or more cargo barges may be loaded from the same set of doors on the car float. Negro labor is used exclusively in the handling of the freight. The loss and damage claims due to bad handling for the fiscal year ending in June, 1923, aggregated $45,689.00 or approximately two per cent of the line's expenses.

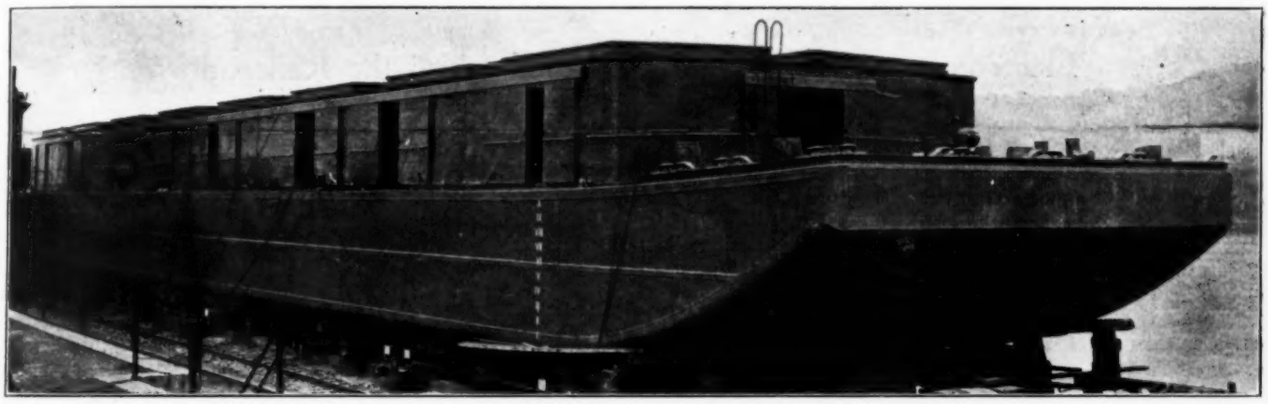
On the river, operations are carried on in fleets of several barges, pushed by a tow boat about which the barges are grouped, as shown in an accompanying photograph. Most of the tows are made up of four or five barges, the cargoes ranging from 8,000 to 10,000 tons on down-stream tows and 6,000 to 7,000 tons on up-stream tows. The average speed of the tows is a little less than five miles an hour. Of the hours in which the tow boats are in service, however, over half are lost on account of delays from various causes. The principal delays are due to repairs at terminals, repairs en route, bad weather, channel conditions, awaiting cargo or orders and doing harbor work. The service has no fixed operating schedule for its tows, the fleets embarking from the terminals approximately every six days and reaching their destinations as soon as possible, according to the conditions encountered individually. While en route, hourly reports are made by wireless as to position and condition. Channel reports are furnished regularly by the United States Engineer Corps as a basis on which to govern the operation of the tows and dredges.

A rather unusual condition exists in the handling of the labor question on the tow boats. A virtual "open shop" basis is in effect, but employees may belong to unions if they wish. This system has been fairly successful, although in the early part of 1923 a strike of the tow boat captains resulted in a temporary cessation of operation of the line.

Between January 1 and March 15, no operation is attempted between St. Louis, Mo., and Cairo, Ill., on account of the low stage of the river, arrangement being made to route shipments between these points over the Illinois Central. On the remaining portions of the line, shipments are maintained throughout the year, although in case of extraordinary conditions resulting from low water or other causes, temporary shut-downs are occasionally necessary.

While operation of the line on the Mississippi river is now closely approaching the point at which, under favorable river conditions, it will pay for itself, the Warrior river section is still, and probably will be for some time, a liability rather than an asset. The development of the service has been concentrated mostly upon the Mississippi river section so that it is possible that, when the floating equipment and terminals on the Warrior river have been expanded to a point where they can handle the traffic efficiently, something over operating expenses will be earned there.

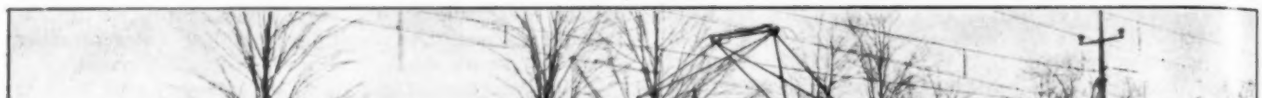
The expenditure of a very large sum of money is imperative if the service is to be made efficient and reliable, and even then the unreliability of the Mississippi river is likely to prove too great a burden. The service needs greatly augmented floating equipment of modern, efficient type and up-to-date freight terminals at every point along the two rivers from which freight originates or is shipped. The government is now, and has been for years, spending large sums annually in channel control on the Mississippi and the Warrior rivers, particularly the former. Even more must be spent if the channels are to be kept clear and delays avoided. Being government-owned, the line must depend on congressional appropriations for its development since its revenues have been insufficient. It is doubtful whether such funds will be forthcoming if the operations of the line continue to be unprofitable.



Type of Barge Used in Mississippi-Warrior Service

While there is probably adequate potential traffic to fill its cargo barges, it is doubtful if there is an economic justification for the Mississippi-Warrior Service. Assuming that it will continue, however, it must reduce its high operating costs and remove the uncertainty of its operation if its revenues are to keep pace with its expenses. At present it is carrying capacity cargoes and losing money. The possible remedy lies in increased facilities to bring about increased revenues and proportionately lower expenses.

From the experience of the government barge line, it would appear that any such transportation agency lacking the advantages enjoyed by the publicly owned one, would inevitably and quickly fail. The Mississippi-Warrior Service is the beneficiary of a practice whereby its plant is furnished by the government free of charge; it has no fixed charges. These are blessings which no private agency could secure, yet even with them, the government service has not made its expenses. Its losses during the entire five-year period of its operation have amounted to $2,036,608.17. The government's experiment is costly but it is a worth-while expense if it will establish the inherent strength or weaknesses of inland waterway transportation.



New L-5 Type of Electric Locomotive Built by the Pennsylvania Railroad and Equipped by the Westinghouse Electric & Manufacturing Company

A. I. E. E. Holds Transportation Meeting

Electrification Possibilities Discussed—Also the Railroad Problem in General

A TRANSPORTATION MEETING on Tuesday, February 5, was a feature of the twelfth mid-winter convention of the American Institute of Electrical Engineers held in Philadelphia, Pa., February 4 to 8. The afternoon session was devoted to a semi-technical discussion of electrification and allied subjects while the evening program was given over to the presentation of the railroad problem as a whole in five brief addresses. The evening meeting was broadcast from radio stations in New York City, Schenectady, N. Y., and Pittsburgh, Pa.

Performance and Design of Locomotives

The afternoon meeting was opened by Professor Harris J. Ryan, president of the Institute. Professor Ryan introduced N. W. Storer of the Westinghouse Electric & Manufacturing Company who presided during the presentation of papers and subsequent discussion. The first speaker was L. G. Coleman, assistant general manager, Boston & Maine. Mr. Coleman read a paper in which he stated that there is lots of lost motion in railroad operation, a remedy for which has not yet been evolved. Large improved types of locomotives, he said, economize fuel and increase railroad capacity but they also introduce other factors which increase what may be termed lost motion. Under similar service conditions old and simple types of locomotives were available for service 75 per cent of the time, while modern locomotives are available for service only about 45 per cent of the time. The cost of maintaining locomotives is now about four times what it used to be; this sacrifice is made to obtain greater operating efficiency. Years ago, he said, 65 per cent of the motive power was ready to turn when it arrived at the terminal. Now, in his opinion, probably not more than 10 per cent can be turned until minor repairs have been made. Lengthening divisions has reduced this lost motion to a certain extent, but quicker turning must be had. The field, he maintained, is open for electrification, but there is need for standardizing electrical equipment and reducing its cost.

The second speaker was J. E. Crawford, assistant general manager, Norfolk & Western. Electric operation on the Norfolk & Western, he stated, was considered first only as a pusher service, but a study showed that a distance of 30 miles between and including an assembly yard and a classification yard should be electrified. Comparative cost figures are difficult to obtain as the section electrified does not include a whole division, but according to the best calculations, electrification has effected a saving of about 8 per cent in operating costs. The cost of repairing and maintaining the locomotives is also difficult to determine and the high cost during past years has been caused by the locomotives being built without precedent and the corresponding need for considerable redesigning. Mr. Crawford also pointed out the fact that the actual cost of repairs in 1922 on a basis of tractive effort was 37 per cent greater for steam locomotives than for electric.

Electric locomotives, he said, should make about twice the mileage that steam locomotives make, but past performances show something less than this as there were eleven locomotives available when eight could do the work. The mallet locomotives used on the division are available for service about 50 per cent of the time, while the electrics were available 85 per cent of the time. Electric locomotives, he said, cost, pound for pound, about twice as much as steam, this being true for the locomotives placed in service in 1915 and also for those purchased in 1923. Fuel economies made by the electric locomotives he estimated to be from 25 to 30 per cent. Regenerative braking is of great assistance in handling heavy trains. In summing up, Mr. Crawford said that delays due to failures are reduced because of reduced damage to equipment by rough handling; economies have been obtained principally by the fact that electrification of the section has increased the capacity of the whole road. It is the intention of the road, he said, to extend the electrified section eventually to include the whole division.

What the Electrical Engineers Must Do

N. D. Ballantine, assistant to the president, Seaboard Air Line, said he was impressed with the lack of correlated information covering electrification and stated that in compiling

such information it was essential to remember that railroads are built to take care of peak demands, The chairman, Mr. Storer, supplemented this by asking what the railroads are looking forward to in the way of further increasing drawbar pull and improved methods of handling trains.

Mr. Crawford replied that they were looking forward to the use of steam locomotives for a long time to come and that he hoped there was no limit to the possible developments. At the present, there are definite limitations imposed by weight of bridges, weight of rail, length of passing tracks, classification yards, etc. Speed of freight trains in his opinion could be increased to 50 miles an hour.

A. H. Babcock, electrical engineer, Southern Pacific, told how steam power was used on the Southern Pacific to meet difficult operating conditions and offered the opinion that heavy fixed charges block the economy of electrification. He said also that second track must be had by many roads before they will consider electrification because of the great desirability of second track for preventing all kinds of delays. He cited one instance where one steam locomotive made a continuous run of 815 miles. Not including terminals, tunnels and "bottle necks," like the Norfolk & Western, he said, "Show us one electrified property that is making any money."

W. S. Murray, consulting engineer, replied to this challenge by stating that there was no such property because there was no complete installation of electrification anywhere. The New York Central he said is a switching service and not a trunk line, while the New Haven has not been able to take advantage of its electrification because it could not afford to purchase needed additional locomotives. The St. Paul because of its long line and few trains could not be expected to show a profit. There are many sections of railroad, he said, which if electrified would undoubtedly show economies. He also questioned the statement made previously that steam locomotives are available for service 45 per cent of the time. Mr. Storer then asked if any one present could present a picture of the problem and outline the several conditions to be met.

William Elmer, division superintendent, Pennsylvania, replied to several of the questions which had been raised. Couplers, he said, have been designed and redesigned many times and he expressed the opinion that for many years to come there will probably not be much change made in an effort to increase either the strength of couplers or car underframes. Strength of bridges he said will probably not be greatly increased. He showed how trains can be so long that the crews cannot operate them efficiently and offered the opinion that a 100-car train represented about the practical limit. While 125 and 150-car trains can be used successfully under a few special conditions, too long trains cause unnecessary delays. He stated that he did not think that a speed as high as 50 miles an hour was practicable with heavy type freight cars; also that increased speed over a division will not reduce wages although it may effect other economies.

With regard to the availability of steam locomotives he referred to figures compiled during federal operation which showed that steam locomotives over a given period of time made 56 miles a day. If the average speed was 10 miles an hour, he said, this represented a little less than 25 per cent availability, or less than that if they went faster. He concluded by expressing the opinion that when 50 per cent of the locomotives on any railroad make 3,000 miles per month, they are giving good performance.

What Is in Store for the Railroads?

Harris J. Ryan, president of the Institute, presided at the evening meeting. E. G. Buckland, vice-president, New York New Haven & Hartford, was the first speaker. His subject was "Place of Transportation in Civilization." He recalled instances in history to show the part played by transportation in the development of civilization. Germany, he pointed out, could long hold out against the allies because of effective transportation facilities, while Russia fell because of their lack. The United States is the outstanding example of what a good system of transportation can accomplish.

Francis H. Sisson, vice-president, Guarantee Trust Company of New York, spoke on the "Credit Question in Transportation." Transportation, he said, is everybody's problem. Car and equipment shortage, he said, is now a thing of the past, improved relations now exist between the management and the employees and the roads are showing better returns on investment than they have been able to show for a long time. The roads must now make large progress in expansion of facilities, if they are not to be swamped by the growing needs of the country.

Railroad regulation, he stated, governs about 90 per cent of receipts and 75 per cent of expenditures and the building up of the railroad system as a whole is retarded by fear of closer regulation. As an illustration, he cited the trend of the price of railroad securities. The financial position of the roads, he said, is such that they must not borrow more money without paying off some of their indebtedness. Investors' dollars cannot be commandeered; they must be attracted by the railroads' earning power and credit and unless this is done government operation is the only alternative. Government operation in his opinion would halt initiative and creative ability with resultant inefficiency and expense.

Ralph Budd, president, Great Northern, was the third speaker. His subject was "Transportation and the Rural Situation." Agriculture and railroads, he said, are singularly dependent upon each other. He showed that since the war neither the farmers nor the railroads have been prosperous. Deflation after the war reduced the value of farm products in much greater proportion than that of other commodities. He told how progress had been made before the war in diversification of farm products, how during the war wheat was asked for and was produced by the farmers and how diversification of products has again been taken up, but much time has been lost and the value of wheat has been destroyed by over-production. He expressed the opinion that the cost of railroad labor would not and should not be reduced.

H. B. Thayer, president, American Telephone and Telegraph Company, was the fourth speaker. His subject was "The Public's Transportation Problem." The public, he said, is inclined to clamor for a reduction of railroad rates without inquiring into what effect a reduction in rates may have upon the service. Cost of labor and material has increased; the roads must expand and the cost of expansion will be increased proportionately. Earnings, he pointed out, must be sufficient to meet increased costs. The investor, he said, doubts if the railroads will be permitted to earn a return sufficient to cause railroad securities to compete with tax exempt securities. The public interest demands that the railroads should be able to earn such a return.

Albert J. County, vice-president, Pennsylvania Railroad, was the last speaker. His subject was "Solid Foundations for Better and Cheaper Transportation." He said that statesmen for a long time have been trying to mend the railroads while the public has waited. He suggested seven foundations for strong railroads upon which the public should insist. They are as follows:

1. Give the railroads a legislative rest and let transportation catch up with legislation.

2. Allow the railroads to earn six per cent on their investment every year. The country will never grow rich from impoverished railroads.

3. Secure reasonable taxation. Railroads should not be taxed the same as unregulated industries but in accordance with net results.

4. Railroads should have a pre-right to negotiate wages

with employees and only after they fail in this should the public take a hand.

5. Railroads want a real valuation based on facts and not on political whims.

6. Railroads should have the power of voluntary consolidation and all consolidations must have for their bases sounder credit.

7. The railroads see the need for expansion, including electrification, but the capital for this cannot be attracted while the roads earn insufficient returns.

In conclusion he stated that there is no need for pessimism if the public will insist on freedom from restrictive regulation.

The Pennsylvania Railroad held a motive power exhibit at West Philadelphia in connection with the meeting. It included the latest types of steam and electric locomotives, multiple-unit electric cars and a gasoline rail car. The equipment shown represented an investment of about $750,000.

Two electric locomotives were exhibited which have contrasting characters. One, which is designated as Pennsylvania Class "FF-1," has the distinction of being the most powerful single unit electric locomotive ever constructed for any railroad in the world. The "FF-1" has been designed for heavy, slow speed freight service. It weighs 516,000 lb. and is capable of exerting a starting tractive effort of 140,000 lb. At a speed of 20 miles an hour it is capable of producing continuously a tractive effort of 73,000 lb. This locomotive was built by the Pennsylvania at its Altoona works and equipped by the Westinghouse Electric & Manufacturing Co.

The other electric locomotive is known as Pennsylvania Class "L-5." It was designed to be, as nearly as possible, a general utility locomotive, representing a standardized type which can be utilized with high efficiency and economy under almost any operating conditions and in any form of service, except switching. The construction is such that simply by a change in the gear ratios between the motor and the wheels it can be converted from a freight to passenger locomotive, or vice versa. Its electrical features have been so planned that by changing the control apparatus, it can be operated either with alternating or direct current. The "L-5" weighs 408,000 lb. When geared low for freight service it develops a starting tractive effort of 100,000 lb., and at a speed of 23 miles an hour will produce a continuous tractive effort of 50,000 lb. When geared for passenger service it has a starting tractive effort of 54,000 lb., and when running at 46 miles an hour, or standard average express speed, it will develop continuously a tractive effort of 25,000 lb.

The five steam locomotives exhibited included all requirements of steam railroad service except switching. Two freight locomotives were shown, one being of the Class "I-1s," the Pennsylvania standard heavy freight locomotive. In working order it weighs, with its tender, 582,100 lb. It has 62-in. driving wheels and develops a starting tractive effort of 90,024 lb. This particular locomotive was built at the Baldwin Locomotive Works from Pennsylvania Railroad design. A large number of these locomotives were also built at the Altoona Works.

The other freight locomotive shown was of the Mallet articulated type known as class "HC-1s." This locomotive is intended only for pusher service. Its use is confined to helping trains on the east and west slopes of the Allegheny mountains. It also has 62-in. driving wheels, and weighs in working order and with its tender, 805,500 lb. It develops 135,000 lb. starting tractive effort.

The other three steam locomotives embraced in the exhibit were all for passenger service. One is the newly designed Class "M-1," a mountain type locomotive intended for through express passenger service where maximum power is required. This locomotive is also adaptable for fast through freight service, such as the handling of perishable and other preference freight trains over long hauls. It has 72-in. driving wheels, develops 64,550 lb. starting tractive effort and weighs, with tender, 559,600 lb. It was designed and built at Altoona.

The second of the passenger locomotives which was shown is of the Pacific type and is known as class "K-4s." It has 80-in. driving wheels, a starting tractive effort of 44,460 lb. and a weight, with tender of 467,890 lbs. It is the Pennsylvania standard for general heavy through passenger service and answers the requirements of all trains of that character except those for which the extreme power of the "M-1" is needed. It was constructed at Altoona.

The third passenger locomotive exhibited is known as class "G-5s." It is a medium weight locomotive intended for heavy local passenger service where great tractive effort is necessary in order to gain speed rapidly in starting, thus making it possible to maintain high average speed over accommodation runs where many stops are made. It has 68-in. drivers, develops 41,328 lb. starting tractive effort and weighs 413,500 lb. It was designed and built at Altoona.

Supplementing the seven engines, two other types of motive power were embraced in the exhibit. One is the multiple unit electric passenger coach, now standardized for suburban electric service, such as that rendered in the Philadelphia district on the electrified portion of the Main line and the Germantown and Chestnut Hill branch. It seats 72 passengers, weighs 118,600 lb., operates from either end, and was built from the standard design of the railroad.

The other is a gasoline rail motor car, designed and built by the J. G. Brill Company, of Philadelphia, for use on railroad branch lines where the traffic is too light to support steam service or warrant electrification. The Pennsylvania Railroad is now operating several cars of similar type on various branches. It is 42 ft., 8 in. in length, weighs 30,000 lb., seats 38 persons in the passenger compartment and has a baggage compartment 11 ft. 3 in. in length, with emergency seats for eight more passengers.

Kadel & Herbert

First Train to Leave Paddington Station (Great Western Railway), London, for Chester After Beginning of Recent Enginemen's Strike in Britain

Adequacy of Facilities in the Northwest

Performance as a Whole Compared Not Unfavorably with That of 1920 or 1921—No Complaint in 1923

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION has sent to the Senate a detailed report in response to Senate Resolution No. 414 of its investigation concerning the adequacy and sufficiency of the transportation facilities furnished in 1922 for the movement of the products of the northwest Pacific states by the carriers which serve that section. It has also ordered the proceeding discontinued.

The report comprises 46 typewritten pages, of which the following is an abstract:

We can make no general categorical statement of the extent to which the carriers serving the northwest Pacific states failed during 1922 to supply adequate transportation facilities for the movement of apples, other perishables, and other products, and we cannot afford an adequate view of the transportation difficulties experienced in that section by reporting merely the number of cars ordered by shippers as compared with the number furnished, or the number of carloads of products that were not marketed. All of some crops eventually moved to market though not at the times, in the manner, to the places, and in the condition they otherwise would. Because of delay in furnishing transportation, a substantial tonnage of other products was never offered for shipment. As these conditions varied by districts and commodities, some detailed explanation is necessary.

Apples

In general, there were no blocks of commercial grades of apples that were not eventually shipped, but the growers nevertheless suffered considerable losses through the inability of the carriers to furnish cars at the times necessary to a proper handling of the crop. The experience of shippers is that there is a distinct period in which each variety of apples must be marketed if satisfactory prices are to be obtained therefor, and that if held until after the prime period has passed or the demand therefor abated, loss is occasioned both by deterioration in the quality of the fruit and consequent diminution in value and because of the adverse effect upon the market of offerings of later varieties with which they compete. The shippers generally prefer to move a fair portion of the late apples before winter in order to avoid the necessity of heater service. They state that the use of heaters often detracts from the quality of the fruit through smoke and odor, and by reason of the susceptibility of stored fruit to variations in temperature.

Forest Products

Lumber and forest products move in greater volume than any other commodity produced in the Pacific northwest. Shipments of lumber in 1922 by members of the two principal lumbermen's associations in this district exceeded those for any previous year. Nearly all the lumber cut in 1922 moved, but, as the amount cut is based upon ability to sell, it is possible that more would have moved except for lack of cars. The lumber cut in the Pacific northwest is steadily increasing due in part to a decreasing supply in the south.

The lumber movement is itself fairly steady throughout the year with slight increases in volume in May and October. In years of good business a stringency of cars commonly develops in midsummer, due in part to the transportation demands of seasonal crops. In 1922 the shortage was not as severe as in some prior years, though during the period October 14 to December 30 the car supply afforded western Washington mills averaged but about 27 per cent of their rated capacities. This situation resulted mainly from the preferential use of box cars for moving perishables and from the slow return movement of cars from the east. During 1922 the Inland Empire mills, whose product is largely finished lumber, enclosed thousands of gondola cars because of the shortage of box cars.

Lumber shippers in Idaho received practically all the cars needed, and Oregon mills made few complaints. The Southern Pacific lines in Oregon supplied from 97 per cent in July to 80 per cent in November of all cars ordered for lumber loading. The apple growers at Hood River experienced some difficulty in obtaining box shooks from the Puget Sound country because of the shortage of cars. The late movement of shooks, which amounted to some 200 carloads, became necessary because of the enforced storage of apples. Unpacked apples take about 50 per cent more box space than when packed.

During September and the forepart of October the Northern Pacific furnished only about 70 per cent of the requirements for movement of logs, and the Milwaukee but about 65 per cent. The Great Northern made a better showing, due to its small log movement, but none of the lines serving the Pacific northwest had a full supply of cars for logs during this period. During the period from August 1 to December 15, the Spokane, Portland & Seattle filled but from 52 per cent to 82 per cent of its orders for flat cars for loading long timbers and piling. Similarly the Spokane International was short of equipment for loading lumber and posts from early in September, 1922, to the last of February, 1923. The carriers satisfactorily met the requirements for fuel loading.

All the 1922 wheat crop of Washington, Oregon and northern Idaho eventually moved to market, though not at the times and in the manner desired by the shippers. The wheat from this section, with the exception of a small amount which goes east, moves to Puget Sound ports and lower Columbia River cities for milling. Practically three-fourths of it is exported as flour and is marketed on contracts which call for delivery on specified vessels. Prompt and dependable movement is therefore important to the Coast millers, who are in competition with Canadian mills. Movement of the 1922 crop lagged materially because of the scarcity of suitable equipment. During November and December the Northern Pacific closed its mines certain days of the week in order to permit shippers to load the open top cars with grain and hay.

The Southern Pacific lines in Oregon furnished a full supply of cars for loading grain and hay, except that in August and September the supply was but 85 and 83 per cent for grain, and 91 and 75 per cent for hay, respectively, and 94 per cent for hay in November.

The principal production of hay in the Pacific northwest is east of the Cascade Mountains and the bulk of that produced in Washington, Oregon, and northern Idaho moves west. A substantial part of the 1922 crop from this district moved in open top cars. Much of this suffered damage from rain as the method of loading made protection by tarpaulins difficult.

In General

As to many commodities, the transportation service rendered was entirely sufficient. For example, in 1922 southern Idaho produced 921 cars of lettuce, 50 cars of watermelons, 25 cars of peaches, probably as much celery, a few

cars of cauliflower, and about 1,700 acres of sugar beets, all of which moved to market in a generally satisfactory manner and in their proper seasons. A delay of 5 or 10 days occurred in the movement of the celery after the crop was ready for harvest, but no material damage ensued. Lettuce received preference in the supply of refrigerator cars, and complaints from growers on account of transportation service were very few.

In general, lumber and fruit were more affected by the scarcity of cars than other products of the northwest because they move in greater volume. The Great Northern experienced a severe shortage of box cars during the last 3 months of 1922 and of refrigerator cars during October and November. The Oregon-Washington did not run short of refrigerators until the forepart of October, due to the failure of earlier crops to move in as great volume as anticipated. The Oregon Electric Railway, which is a part of the Spokane, Portland & Seattle system, met in full its requirements for cars. Due to inability to obtain refrigerator cars from its connections, the Spokane & Eastern lost a substantial amount of traffic to the trunk lines. There follows a tabulation which gives the number of box and refrigerator cars ordered and loaded and the percentage loaded to ordered during the last 4 months of 1922 on the lines of 5 important carriers in the Pacific northwest. System figures only are available for the Great Northern, and the Southern Pacific figures make no separation between classes of closed equipment.

	Box				Refrigerator			
	Sept.	Oct.	Nov.	Dec.	Sept.	Oct.	Nov.	Dec.
N. P. Ry.								
Ordered	15,340	28,839	24,319	27,370	5,405	6,104	4,844	1,769
Loaded	10,278	8,864	6,643	11,314	5,405	2,748	2,214	1,754
Per cent	67	31	27	41	100	45	45	99
C. M. & St. P. Ry.								
Ordered	9,998	11,151	11,139	8,015	544	778	716	277
Loaded	3,971	3,746	4,972	5,712	544	562	340	277
Per cent	40	34	45	71	100	72	47	100
S. P. & S. Ry.								
Ordered	7,971	10,065	10,298	3,984	99	420	518	218
Loaded	3,994	4,043	3,012	3,445	99	330	236	218
Per cent	50	40	29	86	100	79	46	100
O. W. R. & N. Co.								
Ordered	10,454	10,228	6,080	4,624	1,236	2,713	1,991	1,137
Loaded	7,983	5,595	5,257	4,624	1,236	1,057	1,189	1,137
Per cent	76	55	86	100	100	39	60	100
O. S. L. R. R.								
Ordered	17,036	15,888	12,212	7,033	5,049	7,968	7,528	2,587
Loaded	8,247	9,932	8,533	6,055	2,891	2,920	3,457	2,587
Per cent	69	63	70	86	57	37	46	100
Total								
Ordered	55,799	76,171	64,048	51,026	12,333	17,983	15,597	5,988
Loaded	34,473	32,180	28,417	31,150	10,175	7,617	7,436	5,973
Per cent	62	42	44	61	83	42	48	99
G. N. Ry. (System)								
Ordered (1)	2,898	3,611	2,955	2,345	318	1,000	1,249	1,025
Loaded (1)	2,370	2,296	1,478	1,623	318	788	561	461
Per cent (1)	82	64	50	69	100	79	45	45
S. P. Co. (Oregon)								
Ordered (2)	7,807	14,596	23,138	9,293	.....	.....	.....	.....
Loaded (2)	7,571	4,592	2,694	4,256	.....	.....	.....	.....
Per cent (2)	97	31	12	46	.....	.....	.....	.....

(1) Daily average.
(2) All closed cars, i. e., box, stock, and refrigerator.

The above table indicates primarily the extent to which the carriers were unable to move freight as currently offered. Because of the practice of filing new orders each day for all the traffic ready for movement, the figures as to cars ordered, except where shown as a daily average, may contain numerous duplications. Obviously, the figures as to cars ordered are also subject to inflation in times of car shortage by reason of the desire of shippers to secure enough cars for shipments actually ready to move. The difference between the total cars ordered and loaded does not represent carloads of freight on hand at the close of the period ready for shipment.

Sufficiency of Facilities

From the material which the record affords we can best report on the sufficiency or insufficiency of the transportation facilities provided by the carriers concerned for the service of the Pacific northwest during the summer and fall of 1922 by briefly referring to the number and kinds of cars owned by them, the amount of equipment on line and its condition for service, the efficiency with which it was operated, and the amount of freight moved as compared with the performance of other years. Since lumber moves chiefly in box cars, and agricultural products mainly in refrigerator and box cars, the figures applicable to those classes of equipment will be taken as typical of the provision made for the movement of such commodities.

Following is a tabular statement by classes of equipment of cars owned by several principal carriers which serve the Pacific northwest as of June 1 and December 1, 1922:

	Box	Refrigerator	Gondola[1]	Stock	Flat	Other	Total
U. P. System:		Supplied					
June 1	26,971	by	11,950	6,571	2,866	363	48,721
Dec. 1	29,480	P. F. E.	11,934	6,504	2,858	363	51,139
C. M. & St. P. Ry.:							
June 1	36,343	1,671	16,281	4,917	5,705	2,218	67,135
Dec. 1	38,116	1,632	16,356	4,836	5,541	1,973	68,454
N. P. Ry.:							
June 1	25,719	[4]4,151	6,287	2,093	7,353	[2]886	46,489
Dec. 1	25,293	[4]4,780	6,252	2,082	7,264	[2]886	46,557
G. N. Ry.:							
June 1	32,890	5,165	2,502	1,590	3,568	[3]8,750	54,465
Dec. 1	32,787	5,418	2,996	1,542	3,628	[3]8,596	54,967
S. P. & S. Ry.[4]:							
June 1	567	....	....	13	112	30	722
Dec. 1	566	....	....	13	111	29	719
S. I. Ry.:							
June 1	45	3	120	....	65	....	233
Dec. 1	49	3	120	....	74	....	246
S. & E. and I. E.:							
June 1	211	6	15	9	128	....	369
Dec. 1	211	6	15	9	127	....	368
Total—							
June 1	122,746	10,996	37,155	15,193	19,797	12,247	218,134
Dec. 1	126,502	11,839	37,673	14,986	19,603	11,847	222,450

[1]Including coal cars.
[2]All but 62 are ore cars.
[3]Ore cars.
[4]This line uses G. N. and N. P. cars as its own.
[5]Excluding 1,000 Northern Refrigerator Line cars which the Northern Pacific uses from August to March of each year.

In December, 1922, the Milwaukee arranged for 1,400 additional refrigerator cars. These began to arrive in December, and by the end of January, 1923, 1,000 of them were on its rails. The balance have since been received. During 1922 the Great Northern, Northern Pacific, Milwaukee, and Union Pacific systems received new equipment as follows: 5,124 box cars, 5,853 refrigerators, 336 stock cars, 193 flat cars, and 107 locomotives.

The Northern Pacific can customarily meet its requirements with a 90 per cent car supply, but in November, 1922, its requirements exceeded its ownership. Its refrigerator season extends from August to the end of February with a slack period in late December and early January. In November, 1922, the deficiency under ownership of cars on the Great Northern amounted to more than 12,000 cars and exceeded the deficiency for any other month in 1922 or any month in 1920 or 1921.

The Great Northern was unable to supply its own refrigerators in sufficient quantity to meet the demand in the Wenatchee district. Late in the season it accepted cars from the Oregon-Washington and the Milwaukee at Spokane for loading at Wenatchee and re-delivery to those roads at Spokane for the long haul east. During the period from December 1; 1922, to January 7, 1923, the Great Northern so received 1,157 Pacific Fruit Express refrigerators from the Oregon-Washington. The number of refrigerators received from the Milwaukee does not appear, but from December 16, 1922, to January 8, 1923, inclusive, the Great Northern loaded 207 refrigerators in the Wenatchee district for delivery to the Milwaukee at Spokane.

In 1922 the Spokane International was able to secure but 175 refrigerators from the Canadian Pacific, with which it is affiliated and upon which it customarily depends for a large portion of its car supply. The balance of the refrigerator equipment furnished for loading, amounting to 343 cars, it obtained from its Spokane connections.

The sufficiency of locomotive power provided in 1922 by

the carriers which serve the Pacific northwest was materially affected by the strike of the railroad shop crafts. In general the power on these roads was in good condition in June, but materially depreciated in effectiveness toward the close of the year. This impairment in power retarded the movement of freight on these lines, but was not the limiting factor in furnishing cars. Almost without exception these carriers could have handled more trains had cars been available. The Spokane International, the Spokane & Eastern, and the Inland Empire were not subjected to the shopmen's strike, and were affected by it only indirectly in the supply of cars.

Despite the inability of the western lines to secure a prompt return of their equipment from other railroads and the impairment of power as a result of the shopmen's strike, their performance in 1922 compared as a whole not unfavorably with the performance in 1920 and 1921. The following statement of freight originated on the lines which serve the Pacific northwest is illustrative. Except as noted, the period covered in each year is from June to December, inclusive.

Railroad	1920 carloads	1921 carloads	1922 carloads
Great Northern (system)	572,530	394,899	533,256
Northern Pacific (system)	431,473	393,994	454,945
Chicago-Milwaukee & St. Paul (system)	587,054	519,136	624,514
Spokane, Portland & Seattle (system)	32,266	28,330	31,731
Oregon-Washington R. & N. Co. (1)	97,130	96,146	103,432
Oregon Short Line (2)	105,795	96,782	100,820
Southern Pacific (Portland Division)	62,554	71,490	81,843
Spokane International (3)	5,808	5,125	7,032
Spokane & Eastern R. & P. Co.	1,227	1,625	1,102
Inland Empire	1,649	2,133	1,632
Total	1,897,486	1,609,660	1,940,307

(1) Last 30 weeks of each year.
(2) Last 31 weeks of each year.
(3) July 16 to December 31, inclusive, of each year.

Though the above tabulation covers freight originated on the eastern as well as the western divisions of the Great Northern, the Northern Pacific, and the Milwaukee, the figures available by states in general confirm the showing. For example, the principal railroads in Oregon originated almost exactly as much freight in 1922 as in 1920, both as to total and as to general commodity groups, and some 38,000 carloads in excess of the 1921 loadings. As compared with 1921, shipments of forest products were high in 1922, but were low as to fresh fruits and other products of agriculture.

The tonnage of freight originated in Washington in 1922 exceeded that for 1921. The first six months of the year and November showed the most marked increases over the corresponding months of 1921.

For the entire state of Idaho the 1922 tonnage of revenue freight originated was less than for any of the 3 immediately preceding years. The figures for the 4 years are as follows: 1919, 17,760,980 tons; 1920, 19,837,061 tons; 1921, 13,339,072 tons; and 1922, 12,828,394 tons. In southern Idaho the Oregon Short Line originated a greater number of carloads of freight in 1922 than it did in 1921. Despite the general increase in this section, the loadings of sugar beets, sand, rock, and gravel, and of hay fell behind the 1921 loadings.

In general, the transcontinental carriers which serve the Pacific northwest made fairly good time to their eastern terminals, and the greater part of the delay to which all traffic was subject occurred on the lines east thereof. From Wenatchee to the Twin Cities the time in transit during October and November averaged from 4 to 8 days over the usual schedule for refrigerator cars.

Pacific Fruit Express cars averaged 43.7 days per round trip in 1922. This was slightly less than in 1920 and 11.2 days in excess of the 1921 figure. As compared with 1921 the slower movement in 1922 represented a loss of 10,895 loads. The average detention to P. F. E. cars held at principal markets for unloading or reconsignment during the period June to December was 3.5 days in 1922 as compared with 3.4 days in 1921, and 2.9 days in 1920. For the same periods the detention of apples averaged 4.3 days in 1922, 4.1 days in 1921, and 3.7 days in 1920. Exhibits of record which cover the average miles per car per day indicate that as compared with their experience for similar periods in 1920 and 1921 the principal carriers here concerned operated available equipment with somewhat less efficiency during the months June to October, 1922, and more efficiently during the last two months of the year.

Causes Were Nation-Wide

The causes of the failure of the carriers in the northwest Pacific states to furnish transportation as needed to meet the requirements of that section in 1922 have been foreshadowed in part in this report. Those were not confined to conditions in the Pacific northwest. They were nation-wide. The year 1922 saw a general revival of business and industrial activity and the production of large seasonal crops. Despite the cessation of almost all the anthracite coal production and about 60 per cent of the bituminous coal production as a result of the miners' strike beginning April 1 and the difficulties caused by or attendant upon that strike, car loadings of commodities other than coal continued to increase and reached a higher level than during certain of the corresponding months in 1920, the peak year. Minnesota, Michigan, and Maine produced unusually large potato crops. Requirements for lumber throughout the country were unprecedented. Heavy demands were made for refrigerator cars to move the California grape crop, for stock cars in Texas and Oklahoma, for box cars for loading grain in North Dakota, and, in general, for all classes of equipment. The closing of the union mines threw a greatly increased volume of freight traffic upon the carriers serving the non-union bituminous coal fields of Kentucky, Virginia, West Virginia, Tennessee, and Alabama, and severely taxed their ability.

The general strike of railroad shopmen began on July 1, with the result that transportation service and facilities became impaired. As the strikes of coal miners and shopmen continued, a progressive general deterioration in motive power and equipment was manifest. This condition was first felt by carriers serving the active non-union coal fields, whose growing inability to transport resulted in a decreased coal production which was barely sufficient to meet the current needs of the railroads, public utilities, and producers of food. The union bituminous coal miners resumed work at various times on and subsequent to August 15 and the anthracite miners generally on September 11. The resumption of coal mining upon the conclusion of the strikes, with the necessity of restoring exhausted supplies and completing the annual movement before settled cold weather, was contemporaneous with the principal movement of seasonal crops. The combined demands for transportation which resulted cast upon the carriers of the country generally an extremely heavy burden.

The great demand for transportation and the carriers' inability to handle the traffic on their rails because of strike conditions were the main factors in creating a severe shortage of freight cars of all kinds throughout the country.

The delay in delivery of perishables ensuing from congestion resulted in many cases in deterioration which made fruit unfit for storage, led to refusal of consignees to accept shipments, necessitated finding other markets, and thereby further increased the congestion at eastern terminals. Misuse of refrigerator equipment by consignees for storage purposes awaiting sale also contributed in some measure to the congestion and slow movement.

The crippled motive power, heavy traffic, and congestion of cars on the eastern lines made a balanced interchange with the western lines impossible. As a result the western lines were drained of equipment at a time when the demand for transportation was greatest. For example, about the middle

of September the carriers which serve the state of Washington had from 40,000 to 50,000 cars west of their eastern divisions. This supply, which was necessary to care for the traffic currently offered, dwindled to less than 17,000 cars.

The preponderating movement of traffic eastward from the Pacific northwest also contributed to the difficulty of getting cars west. Cars under load move more promptly than do empties especially in times of peak movement and if westbound tonnage were available it would be less difficult to maintain a balanced interchange. At present the water lines which operate through the Panama Canal get a very considerable portion of the westbound tonnage. According to an exhibit of record which covers intercoastal tonnage handled through Seattle, Tacoma, and Portland from January 1, 1921, to May 31, 1923, the westbound tonnage was less than the eastbound in 1921, but in 1922 exceeded it by 59,700 tons, and during the first 5 months of 1923 exceeded it by 53,654 tons. The tonnage of lumber from Seattle, Tacoma, and Portland shipped 31,410 tons of lumber by water; in 1922, 106,636 tons; and during the first 5 months of 1923, 80,680 tons. Of competitive traffic from the Atlantic Coast to Seattle, Tacoma, and Portland the boat lines carried 84,654 tons in 1921, and 280,766 tons in 1922.

In our opinion the railroad shopmen's strike, with the consequent impairment of transportation service and facilities, and the unusual and contemporaneous demands for transportation as a result of improved industrial conditions, large crops, and more than all, of a delayed coal movement due to the miners' strike, were the chief underlying causes of the failure to supply adequate transportation facilities as detailed above. To a less degree congestion of eastern terminals, misuse of cars by consignees and by carriers, the preponderance of eastbound traffic on the transcontinental lines, and uneconomic production and marketing of perishable products were contributing causes.

Remedies

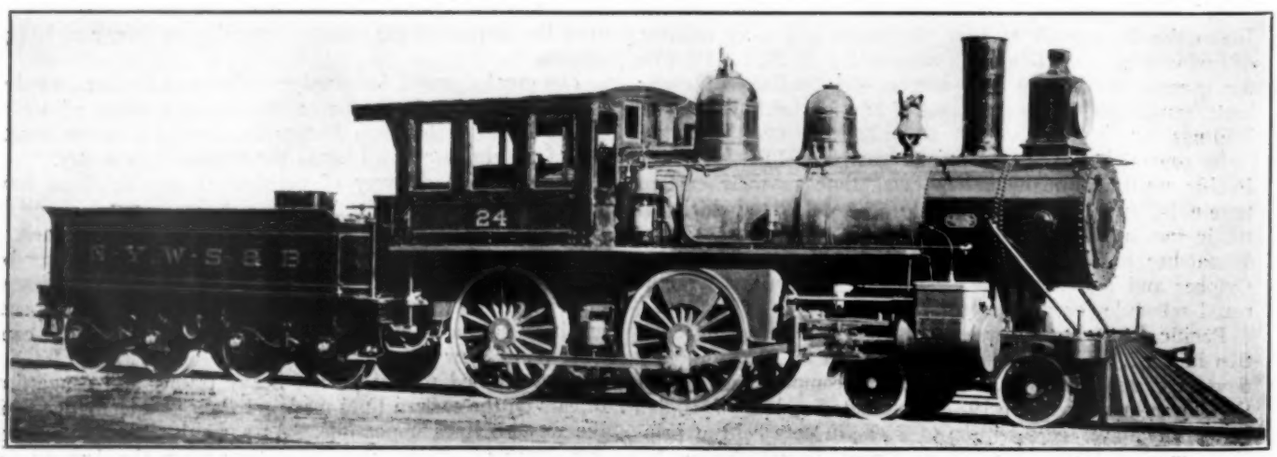
The principal carriers of the country themselves adopted practical co-operative measures in 1923 to remedy any insufficiency of facilities, and to prevent a recurrence of the situation which existed in the summer and fall of 1922, so far as possible. In April, 1923, they adopted a program that provided for expenditures equaling $1,540,000,000 divided between roadway and equipment. They reported 183,367 freight cars and 4,037 locomotives as placed in service during 1923, and 24,379 cars and 510 locomotives as on order on January 1, 1924. In addition to the foregoing, private car lines during 1923 placed 14,508 refrigerator cars in service and had 1,240 remaining on order January 1, 1924. These figures include some cars transferred from railroads to private car lines.

The progress made in 1923 toward the reduction in bad order freight cars to 5 per cent and in bad order locomotives to 15 per cent as contemplated by the carriers' program is indicated by the following statement: [Omitted]

In order to maintain a close watch on the transportation situation in the Pacific northwest in 1923 with a view to exercising our emergency powers if conditions should warrant, and in order that we might better assist shippers and carriers, we established an agent of our Bureau of Service at Portland to cover the entire territory. No occasion has there arisen during the year for the formal exercise of the emergency or other statutory powers of the commission, and there has been a virtual absence of complaint against the transportation service in that section.

On December 27, 1922, we instituted a general investigation into the adequacy of the locomotives and cars of each common carrier by railroad in the United States, and into the practices prevailing or desirable with respect to the ownership, use, and interchange of cars. Hearings in this proceeding have not as yet been concluded. The adequacy of the equipment of the carriers serving the Pacific northwest can scarcely be judged without considering the equipment situation as a whole, particularly as the commerce of the Pacific northwest is largely carried on at great distances, and cars must be carried through to destinations on connecting lines under suitable arrangements for interchange and return.

Because labor conditions clearly abnormal were so important an element in creating the car shortage of 1922 in the Pacific northwest and throughout the country, because of the measures adopted by the carriers themselves to improve their facilities and the success of those measures as evidenced by the unequalled record made in 1923 for transporting freight, and because of the pendency of the general investigation mentioned and the necessity of enforcing by our order any finding therein made that any carrier should "provide itself with safe and adequate facilities for performing as a common carrier its car service," we do not at this time suggest any special remedial or preventive action for Congress to take in connection with the situation under investigation. Considerations of more orderly marketing and better distribution of perishable products of the Pacific northwest than has yet been attained bear directly upon the question of adequacy of facilities, but these matters are beyond our jurisdiction and must be worked out by shippers and dealers in accordance with economic laws.



In the Old Days on the West Shore

General News Department

The **International-Great Northern** has announced that it is to introduce a plan of group insurance for its employees.

The **American Railway Association** has moved the headquarters of district No. 2, Car Service division, from Toledo, Ohio, to 2025 First National Bank Building, Detroit, Mich.

The **Silvis shops** of the Chicago, Rock Island & Pacific, at Silvis, Ill., on last week, Friday, February 1, celevrated the 20th anniversary of their establishment. The shops now employ 1,466 men and are the largest on the Rock Island system.

Railroads operating in Kansas and also the Pullman Company, have been requested by Governor Davis, of that state, to cancel all passes held by members of the Kansas Public Utilities Commission on the ground that the using of passes on other than official business is contrary to the letter and intent of the law.

The Eastern Presidents' Conference, L. E. Loree chairman, has appointed a committee of five presidents to consider a proposition to ask of the Interstate Commerce Commission a rehearing of the question of automatic train control, but the committee has not yet set a day for meeting. It is expected that similar committees will be formed in Southern and Western territory and conferences will probably be held with these other committees. The last order of the Commission, calling for the installation of automatic train-stops on 94 railroads, will, if carried out, involve an estimated cost of $100,000,000, and the railroads will doubtless present an argument that this money could be more usefully spent in other directions, as, for example, in the elimination of grade crossings of railroads and highways.

New England Railroad Club Meeting

James Partington, estimating engineer of the American Locomotive Company, will present a paper on "the Locomotive of Today," at the next meeting of the New England Railroad Club, which will be held on Tuesday, February 12, at the Copley-Plaza Hotel, Boston, Mass.

Santa Fe Organizes for Fuel Conservation

A fuel conservation organization has been established on the Atchison, Topeka & Santa Fe. The committee in charge consists of the fuel conservation engineer, four fuel supervisors covering the different general managers' territories and 14 division fuel supervisors. J. M. Nicholson, fuel conservation engineer, with headquarters at Topeka, Kans., is at the head of the work.

Safety Appliance Order Not to Be Revised

Following a conference of a committee representing the Bureau of Safety of the Interstate Commerce Commission, the Mechanical Division of the American Railway Association and the train service brotherhoods, called for the purpose of considering a revision of the commission's order of March 13, 1911, prescribing standards for safety appliances for equipment, to be submitted to the commission, it has been decided to leave the order in its present form.

Society of Terminal Engineers

The next regular meeting of the Society of Terminal Engineers will be held Wednesday, February 13, at 8 p. m., in the Engineering Societies building, 29 West 39th street, New York City. The subject to be presented will be "The Sibley System," by Richard C. Sibley. This system is presented as the solution of the problem involved in the transfer of metropolitan foods and freights of the trunk lines of New Jersey and the New York Central's west side service. It will be illustrated by lantern slides.

Improved Service at Grand Central Terminal, New York

The New York Central is preparing to signal its four-track line in Park avenue, New York City, leading to the Grand Central Terminal, so as to be able in the rush hours in the morning to operate three tracks southbound and in the afternoon to operate three tracks northbound. This improvement, to cost about $200,000, will extend from the terminal, five miles, to Mott Haven Junction, where the Hudson division and the Harlem division diverge.

Air Brake Investigation to Be Re-opened

The Interstate Commerce Commission has re-opened its proceeding of investigation of power brakes and appliances, in which protracted hearings were held last year, for the purpose of producing testimony regarding tests of the Automatic Straight Air Brake Company's brake system made on the Norfolk & Western in July and August, 1923, and also for the purpose of taking the testimony of certain railroad executives to be hereafter designated by the commission upon the questions involved. A hearing will be held at Washington on February 25.

Texas Roads Ask Increased Valuation

The Railroad Commission of Texas, which has established valuations for the railways operating within the state, has received applications from the Missouri-Kansas-Texas Railway and the Galveston, Houston & Henderson for an increase in their valuations on account of additions and betterments recently made. The Missouri-Kansas-Texas claims an addition of $5,940,665 to the valuation of $52,660,009 made on June 2, 1922. The Galveston, Houston & Henderson claims an addition in value of $366,060 for improvements made since September 30, 1923, when a valuation of $3,044,271 was fixed.

N. Y. Railroad Club to Discuss Highway Crossing Protection

A. H. Rudd, chief signal engineer of the Pennsylvania, will present a paper on Highway Grade Crossing Protection at the next meeting of the New York Railroad Club to be held Friday evening, February 15, at 8 p. m., at the United Engineering Societies' Building, 29 West 39th street, New York City. If conditions permit, one of the Pennsylvania's new flashlight signals will be exhibited. For the benefit of the members who wish to dine together before the meeting, the usual "dutch treat" dinner will be provided at 6 p. m. at the Hotel Len Roy, 56 East 42nd street.

Shippers Resent Interstate Commerce Commission's Orders Taking Locomotives Out of Service

As a result of the ordering of a large number of Pennsylvania locomotives out of service at Indianapolis, Ind., and adjacent points in January by inspectors of the Bureau of Locomotive Inspection of the Interstate Commerce Commission, the Indianapolis Chamber of Commerce held an open hearing on February 2 to ascertain why the commission had taken this drastic action at that time. In opening the meeting, Henry Ditmer, president of the Chamber of Commerce, stated that the conference had been called to see whether the sudden activity on the part of the commission was due to the trouble that the Pennsylvania had had with its employees and with the Labor Board. He stated further that while the business men of Indianapolis do not desire to countenance dangerous conditions they also do not want to see any discrimination. Testimony was presented by shippers, indicating that losses

had resulted from the curtailment of transportation service following the withdrawal of the locomotives from service. Representatives from the Bureau of Service and the Bureau of Locomotive Inspection of the Interstate Commerce Commission stated that the conditions which existed on this road and particularly at Indianapolis were abnormally bad and that the inspectors had no alternative under the law but to order these locomotives out of service. W. C. Downing, general superintendent, and other officers of the road, protested that locomotives were withdrawn from service because of minor defects and that following the transfer of 41 engines from other territories reasonable service had been afforded. At the conclusion of the hearing a committee, consisting of representatives from the Chamber of Commerce, the Board of Trade and the Associated Employers' Bureau of Indianapolis, was appointed to make a detailed study of conditions.

Railroad Rates Not Considered in Conference on Northwest Situation

Executives of the northwestern railroads were among those who attended the conference at Washington on February 4 called by President Coolidge to consider plans for extending financial assistance to banks and farmers in the Northwest, but the subject of freight rates was not brought up either in President Coolidge's opening address or in the reports of committees. The conference gave its endorsement to a plan for the formation of a $10,000,000 corporation, to be financed by private interests with the co-operation of the government, which will endeavor to aid institutions which, while fundamentally sound, are threatened by the present emergency.

Prospects of the Alaska Railroad

That the Alaska Railroad will be self-supporting within another year was predicted by Lee H. Landis, who was appointed general manager of the road several months ago, on his arrival in Washington recently on official business. He says that for the coming season the passenger department has arranged for the booking of four or five special trains each of which will carry upwards of 100 people visiting the Territory. Other indications point to an unprecedented passenger business for the summer season. The road needs three more sleeping cars, a baggage car, and three passenger coaches, as well as a number of Mikado locomotives. Construction of a large hotel by the government at the Mount McKinley Park station on the line is included in the future plans.

Uniform Method of Handling Astray Freight

This is the title of a circular which has been issued by J. E. Fairbanks, general secretary of the American Railway Association, containing a code of rules, which has been approved by a committee of the transportation division and one of the freight claim division, for handling over and astray freight, and for guidance in matching against shorts at destination points. Freight which is found without a waybill is called "Astray freight" after an astray waybill has been made for it.

All such freight must be carefully examined as to contents and marks, and accurately weighed; and the consignee must be notified, if possible. Marks on packages must not of themselves be considered proof of ownership. In cities where two or more roads deliver freight, the local agents should hold meetings periodically for the purpose of comparing records and to see if overs and shorts cannot be made to match one another.

Disastrous Collision at Alfont, Indiana

A collision between eastbound and westbound interurban trains on the line of the Union Traction Company of Indiana at Alfont, Ind., about 24 miles northeast of Indianapolis, on February 2, resulted in the death of 13 passengers and injury to 45; and the reports indicated that others were missing. This collision occurred on a single track line equipped with automatic block signals. Preliminary investigation showed that the eastbound train ran past its prescribed meeting point and that the automatic block signals between Fortville and Ingalls were out of service because of work being done on the high tension signal transmission lines between those points. A freight train on the Big Four, whose tracks parallel those of the electric line at this point, which was passing at the time of the wreck, was stopped and the crew rendered notably meritorious service, taking charge of rescue work. Each train consisted of a motor car and a trailer. Two cars were consumed by fire and some of the dead are said to have been burned to death.

Wage Statistics for November

For the month of November, Class I railroads reported to the Interstate Commerce Commission 1,899,545 employees, an increase of 79,082 or 4.3 per cent over the number reported for November, 1922. The total compensation increased $399,311 or 0.2 per cent. The overtime compensation was $10,039,041 greater in November, 1922. The number of employees reported for the first eleven months of the year 1923 averages 1,887,590, an increase of 255,386 or 15.6 per cent as compared with 1922. The total compensation paid to employees of Class I railroads increased $386,990,898 or 16.0 per cent in this same period.

The monthly earnings, by groups, were as follows:

Group	Monthly earnings of Employees reported on daily basis Nov., 1923	Nov., 1922	Employees reported on hourly basis Nov., 1923	Nov., 1922
Executives, officials, and staff assistants	$429	$417	....	....
Professional, clerical, and general	181	177	$123	$121
Maintenance of way and structures	239	237	86	84
Maintenance of equipment and stores	244	243	120	134
Transportation (miscellaneous)	97	95	120	119
Transportation (yardmasters, etc.)	253	256	143	148
Transportation (train and engine service)	....	....	185	196

Accident Statistics for Third Quarter, 1923

The Interstate Commerce Commission has issued the following summary of accidents reported by steam railways for the third quarter of 1923, compared with the same period in 1922.

Kind of accident	Number of train accidents 1923	1922	Total—trespassers and non-trespassers 1923 Killed	Injured	1922 Killed	Injured
Train accidents—						
Collisions	1,913	1,449	24	568	85	1,203
Derailments	4,048	2,990	115	772	41	662
Locomotive — boiler accidents	18	12	17	17	5	10
Other locomotive accidents	210	227	....	7	....	9
Miscellaneous	750	517	8	66	1	30
Total	6,939	5,195	164	1,370	132	1,914
Train-service accidents—						
Coupling or uncoupling cars			24	494	10	413
Coupling or uncoupling air hose			6	127	3	100
Operating locomotives			6	1,954	6	1,750
Operating hand brakes			8	705	2	537
Operating switches			....	255	1	176
Coming in contact with fixed structures			15	240	19	207
Getting on or off cars or locomotives			161	2,738	120	2,253
Accidents at highway grade crossings			*682	*1,687	†565	†1,422
Struck or run over not classifiable above			751	655	617	555
Miscellaneous			243	4,679	184	4,138
Total			1,896	13,531	1,527	11,551
Total—train and train-service accidents			2,060	14,901	1,659	13,465
Increase or decrease (per cent)			+24.2	+10.7	....	....
Non-train (including industrial) accidents			140	31,252	146	20,611
Increase or decrease (per cent)			—4.1	+51.6	....	....
Grand total—accidents of all classes			2,200	46,153	1,805	34,076
Increase or decrease (per cent)			+21.9	+35.4	....	....

*Excludes 36 casualties to non-trespassers in 8 derailments and 6 miscellaneous train accidents at highway grade crossings, as follows: Derailments: Killed, 9 "other non-trespassers"; injured, 1 trainman, 18 "other non-trespassers." Miscellaneous train accidents: Killed, 1 "other non-trespasser"; injured, 7 "other non-trespassers."

†Excludes 52 casualties to non-trespassers in 3 derailments at highway grade crossings, as follows: Killed, 4 trainmen, 5 passengers; injured, 6 trainmen, 4 other employees on duty, 33 passengers.

The 164 killed and 1,370 injured, in train accidents, as shown in 1923, were divided as follows: 26 passengers, 93 employees and 45 other persons killed, and 691 passengers, 510 employees and 169 other persons injured. Passengers killed were 30 fewer than in the year preceding; trainmen killed, 30 more. Fatalities at highway grade crossings for *nine months* ending with September numbers 1,613 in 1923 as compared with 1,293 in nine months of 1922, an increase of almost 25 per cent.

Commission and Court News

Court News

Party Ordering Cars and Giving No Shipping Directions, Liable for Demurrage

The West Virginia Supreme Court of Appeals holds that where a railway, at a consignee's request, placed its cars on a siding, to be loaded with lumber and the lumber was loaded, but no shipping directions given by either the lumber company or the consignee, and demurrage charges accrued, the party at whose instance the cars were placed is responsible for the demurrage, and judgment therefor in an action against the consignee was affirmed. Such right of recovery was not affected by the fact that the loaded lumber did not conform to contract between buyer and seller.—Davis v. Lawrence Oil & Gas Co. (W. Va.) 117 S. E. 692.

Statement in B/L Disclaiming Knowledge of Contents Overrules Description Therein

The Panhandle & Santa Fé issued a bill of lading acknowledging receipt of certain packages, "contents and condition of contents of packages unknown," but describing the contents as dressed poultry, weight 20,000 lb. Relying on this bill of lading, the consignee paid a draft for $4,000 drawn by the shipper. Some of the packages were packed, not with poultry, but with rabbits and eggs. In an action against the railroad a verdict for plaintiffs was directed for $2,019. The New York Court of Appeals reversed this judgment, holding that the statement of the description supplied by the consignor and recited in the bill of lading did not revoke or overrule the railroad's express disclaimer of knowledge of the contents, under section 21 of the Bills of Lading Act. Section 22 of the act does not affect such a case. It was, the court said, designed to change the rule of the United States courts, (incorporating into the act the contrary New York rule) which had theretofore held that a carrier was not liable for the act of its agent in issuing a bill of lading for goods where no goods had been in fact received.—Josephy v. Panhandle & S. F., 235 N. Y. 306, 139 N. E. 277.

Federal Court Follows State Law as to Care at Crossings

The rule in Vermont, as held in a long line of cases, is that one about to cross a railroad track must look and listen for an approaching train, and must stop to listen if that is necessary to listen effectually. If his vision is obstructed, he must be specially vigilant as regards his hearing. If circumstances are such that his hearing cannot be relied upon, he must look with especial care. He must continue to look and listen as he approaches the track until the last moment when the discovery of a train would avail for his protection.

Calling attention to the trial court's refusal to give such an instruction, in a case where judgment for the plaintiff was reversed on other grounds, the Circuit Court of Appeals, Second Circuit, says: "The federal courts, in order to assure uniformity and harmony of decision in respect of a question of this kind, will follow the law as laid down by the highest state court in the jurisdiction in which the negligence occurs."

It is also held that a rule of the railroad company that an engine should not be run faster than 35 miles an hour is inadmissible as evidence in a crossing accident case. Such a rule is merely a precautionary rule for the guidance of the company's employees.

It is held error to instruct the jury to consider "the fact that the engine was equipped with a whistle and a bell for the purpose of giving warning of its approach." This instruction might lead the jury to believe that having the equipment referred to was evidence of the railroad's duty to use it. Because the engine was thus equipped, it did not follow that the failure to use the bell or whistle was a breach of duty in the circumstances.—Boston & Maine v. Daniel, 290 Fed. 916.

Labor News

N. Y. C. Increases Trainmen's Wages

The New York Central has reached the basis of an agreement with its conductors and brakemen under which an advance in pay, about five per cent, will be granted, as was granted to the enginemen and firemen last month. The conferences took only four days as compared with four weeks or more for conferences with the enginemen and firemen.

Locomotive Brotherhoods Want N. Y. C. Agreement on All Roads

The chiefs of the Brotherhood of Locomotive Engineers and of the firemen's brotherhood have sent a letter to the chairmen of their respective brotherhoods, on the principal railroads, enclosing a copy of the settlement recently reached with the New York Central and giving instructions as to the proper procedure in seeking a similar advance in wages everywhere. The letter warns the chairmen not to accept any changes in the major conditions of employment and tells how strenuous work was required to deter the New York Central from insisting on a reduction in the rate for overtime for the first and second hours after the eighth. The fact that the enginemen of the Rock Island road agreed to accept existing wage rates for another year necessitated two weeks' additional negotiations on the New York Central.

Alton Refuses to Recognize Federated Shopcrafts

The Chicago & Alton, in reply to an order by the Labor Board that it allow the Federated Shop Crafts to represent its shopmen, has sent a formal statement to the board declining, in substance, to comply with the order. The officers of the road declare that to return to the previous practice of dealing with the Federated Shop Crafts would open the way for a recurrence of a strike such as the one called by the national shopcrafts organization in July, 1922. The reply reviews the dispute in detail. The trouble began, according to the statement, when the striking employees, returning to work, came into a majority over the new workers who had organized a "company association" of shopmen. The Alton claims that a valid agreement was entered into between the management and this association and that no change can be made until the time specified has expired; and that at no time in years have the relations between the management and the shopmen been as cordial as they have been since the formation of the "company association."

Wage Increases

In decision No. 2115, the Railroad Labor Board ordered wage increases of 2½ cents an hour to telegraphers on the Charleston & Western Carolina and two cents to telegraphers on the Southern Pacific lines in Texas and Louisiana and the Texas & Pacific. Telegraphers on the International-Great Northern, the Nashville, Chattanooga & St. Louis, and the Virginian were denied increases. Agents at non-telegraph stations on all six roads involved in the decision were also denied advances.

The Chesapeake & Ohio has granted an increase of three cents an hour in the pay of stowers, freight handlers, coopers, truckers and laborers employed at Newport News, Va.; and it has established a rate of 43 cents an hour for stowers and freight handlers and 38 cents an hour for laborers at that point. The Nashville, Chattanooga & St. Louis has granted voluntary increases to its clerical employees ranging from $1 to $5 a month. These increases have fixed the following scale of step rates: Minimum, $56 a month; after six months' service, $60 a month; after twelve months' service, $69 a month and after twenty-four months' service, $84 a month. The Charleston & Western Carolina has granted an increase of $4.80 a month to its section foremen. The Alabama & Vicksburg and the Vicksburg, Shreveport & Pacific have made adjustments in the wages of their clerks in the general offices at New Orleans, La., which aggregate $2,079 a month. The Richmond, Fredericksburg & Potomac has increased the pay of its trick dispatchers $6.96 a month.

Foreign Railway News

Rail Motor Passenger Cars in South Africa

The South African Railways Administration is experimenting with several types of self-propelled rail motor passenger cars for service on branch lines, with a view to ascertaining the most serviceable design for South African conditions, according to Consul G. K. Donald at Johannesburg. An American rail motor coach will shortly be placed in service on the Pretoria district. This car made successful trial runs in the Bloemfontein area. A 50 h.p. rail car has been in service between Walvis and Swakopmund since September, 1922, and is said to have proved most satisfactory. This car, which was manufactured locally, accommodates 24 passengers. Rail motor cars are also being used between Howick and Merrivale, and are to be introduced on the new branch from Kimberley to Barkly West.

Revolution Not Interfering With S. P. of Mexico

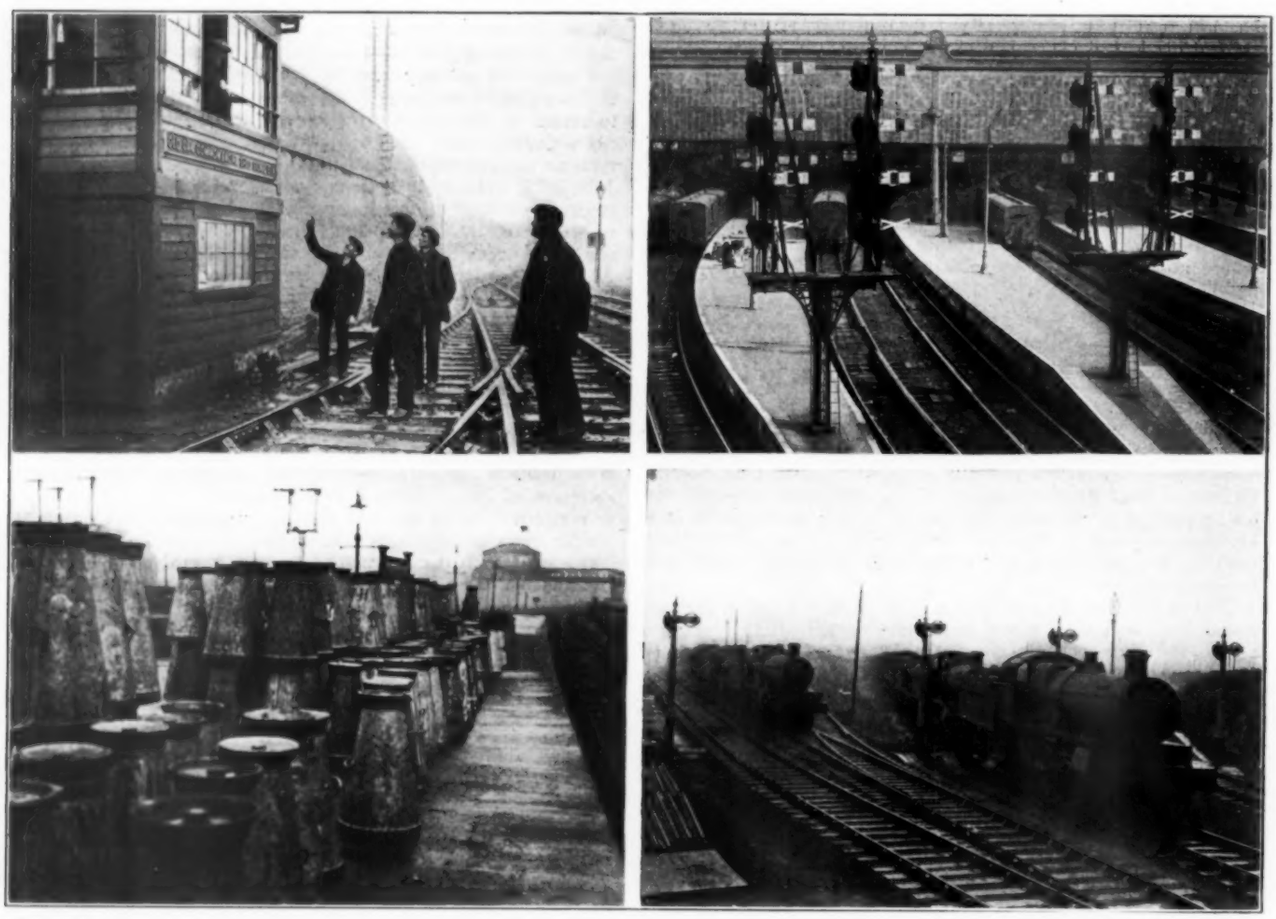
Revolutionary activities in Mexico have not resulted in suspension of train operation or construction work on the Southern Pacific of Mexico, according to an announcement made recently by H. B. Titcomb, president of the company, at Tucson, Arizona. "The only interruption to service," Mr. Titcomb said, "was from December 10 to 14, and that was at the request of Mexican military authorities who used equipment and trains for military purposes in that district. There has been no interruption since that time and construction work on our new line between La Quemada and Tepic has not been interferred with."

Better Railway Service Needed in Brazil

The shortage of rolling stock on the Sorocabana Railway continues to draw protests from shippers along its route, according to Assistant Trade Commissioner Cremer at Rio de Janeiro. The latest is against the poor service given to fruit shippers, who claim that shipments are delayed as much as four days or more, the fruit spoiling in the meantime.

The Sorocabana runs through a fertile and rapidly developing part of the state of São Paulo, but has not been able to keep step with the general march of progress. While locomotives and cars are required, the need for repair shops to keep the present rolling stock in running condition is much greater. The building of a second track on the line between São Paulo and Sorocaba and Avare is also being agitated.

The Central of Brazil proposes to buy 37 locomotives, 12 sleeping cars, 12 passenger cars, 6 steel baggage cars, 6 steel mail cars, 550 freight cars, 50 ventilated box cars for carrying meat and 50 refrigerated box cars for carrying milk and fruit on its broad-gauge lines. For the narrow-gauge lines, 8 locomotives, 4 sleeping cars and 300 freight cars are proposed. The railroad is reported to be suffering from a shortage of rolling stock, and shippers and travelers are said to complain. Expenditures for rolling stock and new construction have been small during the last year, while receipts have steadily increased.



Kadel & Herbert

Some Scenes in London During the Recent Enginemen's Strike: Upper (Left) Trackmen Discussing Situation with a Towerman; (Right) An Idle Passenger Terminus; Lower (Left) Empty Milk Cans ("Churns" in England) Delayed on Their Return Journey; (Right) Locomotives Idle Because of No Available Crews

Equipment and Supplies

Locomotives

THE SHEVLIN-HIXON COMPANY, Minneapolis, Minn., contemplates buying two locomotives.

THE DETROIT, TOLEDO & IRONTON is inquiring for three or four 8-wheel switching locomotives.

THE PITTSBURGH & WEST VIRGINIA is inquiring for two Pacific type and one Mikado type locomotives.

THE UTAH COPPER COMPANY is inquiring for two 6-wheel switching type and two 8-wheel switching type locomotives.

THE CENTRAL OF BRAZIL, according to press reports contemplates buying 35 broad gage locomotives and 8 narrow gage locomotives, also 12 passenger cars, 12 sleeping cars, 6 steel baggage cars and 6 steel mail cars for broad gage lines, and 4 sleeping cars for narrow gage lines; 100 ventilated refrigerator cars, 550 freight cars for broad gage lines and 300 freight cars for use on narrow gage lines.

Freight Cars

THE CENTRAL OF BRAZIL.—See this road under locomotives.

THE ATLANTIC COAST LINE is inquiring for 50 steel ballast cars of 50 tons' capacity.

THE NEW YORK CENTRAL LINES are considering the purchase of 1,000 or more freight cars of 50, 55 and 70 tons' capacity.

THE NEW YORK CENTRAL has ordered from the Clark Car Company 75 air-operated, extension-side dump cars of 30 cu. yd. capacity.

THE NATIONAL TUBE COMPANY is inquiring for 50 all-steel hopper car bodies of 70 tons' capacity and for 25 steel flat cars of 50 tons' capacity.

THE LEHIGH VALLEY, reported in the *Railway Age* of February 2 as inquiring for repairs to 200 box cars, has given the contract for these repairs to the Standard Steel Car Company.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 300 steel-underframe, double-deck stock cars, 36 ft. 1 in. long and for 1,000 automobile box cars of 40 tons' capacity, 40 ft. 6 in. long.

THE ATCHINSON, TOPEKA & SANTA FE, reported in the *Railway Age* of January 26 as inquiring for 2,000 refrigerator cars, has divided this order equally between the American Car & Foundry Co., and the Pullman Company.

Passenger Cars

THE CENTRAL OF BRAZIL.—See this road under locomotives.

THE GREAT NORTHERN is inquiring for 50 refrigerator express cars.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 25 baggage cars and 5 combination baggage and mail cars.

THE CHICAGO GREAT WESTERN has ordered a new type gas-electric passenger car from the General Electric Company.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered 10 gasoline motor cars for branch line service from the Sykes Company, Winthrop Harbor, Ill. These cars have a seating capacity of 45 passengers and will be equipped with baggage compartments.

Iron and Steel

THE DELAWARE, LACKAWANNA & WESTERN has received bids on 1,100 tons of bridge steel.

THE LOUISVILLE & NASHVILLE has ordered 1,900 tons of structural steel from the American Bridge Company.

THE NEW YORK CENTRAL has received bids on 650 tons of bridge steel and on 800 tons of structural steel.

THE FLORIDA EAST COAST is asking for bids until March 3 for steel to be used to build a bridge across St. Johns river, between Jacksonville, Fla., and South Jacksonville.

THE TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS, MO., through the Kansas City Bridge Company, has ordered 577 tons of structural steel from the American Bridge Company.

THE CANADIAN PACIFIC has ordered 50,000 tons of rail from the Algoma Steel Company. This confirms a report in the *Railway Age* of February 2 that the contract had been let.

THE CANADIAN NATIONAL order has been given to the Hall 40,000 tons of rail and placed 20,000 tons with Belgian builders, payments to be made in one, two and three year periods. The English and French rail makers refused to negotiate on the above basis and the inquiry for the remaining 20,000 tons was withdrawn. It is expected that new inquiries will be issued soon for the remaining 20,000 tons.

Signaling

THE NEW YORK CENTRAL is to install 25 Hall single unit light signals at Rotterdam Junction, N. Y., of which 13 will be dwarfs.

THE CANADIAN NATIONAL.—Order has been given to the Hall Switch & Signal Company, Garwood, N. J., for 17 light signals, of the "single unit searchlight" type. Five of these signals will be used as dwarfs. The order includes also 288 relays.

LOCOMOTIVES INSTALLED AND RETIRED DURING 1923

Month	Total Domestic Orders During Year	Installed During Month	Aggregate Tractive Effort	Total Installed Year to Date	Retired During Month	Aggregate Tractive Effort	Owned at End of Month	Aggregate Tractive Effort	On order as of First of Following Month	Building in R. R. Shops
January	.....	...	.....	....	...	.....	....	.....	1,507	...
February	.....	...	.....	589	...	.....	....	.....	1,945	...
March	.....	346	.....	935	...	.....	....	.....	1,974	...
April	.....	293	.....	1,228	...	.....	....	.....	1,956	...
May	.....	469	.....	1,697	...	.....	....	.....	2,041	...
June	.....	301	.....	1,998	...	.....	....	.....	1,902	...
July	.....	223	.....	2,221	...	.....	....	.....	1,772	...
August	.....	362	.....	2,583	...	.....	....	.....	1,517	...
September	.....	384	22,342,517	2,967	260	7,191,302	64,720	2,506,469,051	1,242	7
October	.....	408	21,665,487	3,375	301	7,935,709	64,827	2,520,200,846	942	15
November	.....	333	19,054,713	3,708	282	7,741,395	64,879	2,532,085,380	739	14
December	.....	333	18,260,423	4,041	316	8,738,378	64,896	2,541,607,425	510	14
12 months	1,984	...	.....	4,037*	3,672	.....	....	.....	...	...

(1) Details as to orders from *Railway Age* weekly reports. Figures include all domestic orders placed with builders and railroad shops, but not rebuilt equipment.

(2) Figures as to installations and retirements prepared by Car Service Division, ARA published prior to October in reports relative to progress made on A. R. A. transportation program and more recently in greater detail given in form C. S. 56A-1. Figures cover only those roads reporting to the Car Service Division. They include equipment received from builders and railroad shops. Figures of installations and retirements alike include also equipment rebuilt to an extent sufficiently so that under the accounting rules it must be retired and entered in the equipment statement as new equipment. Figure as to orders as given in first column of table is not therefore comparable with figures relating to installations given in succeeding columns.

*Corrected figure.

Supply Trade News

The Pawling & Harnischfeger Company, Milwaukee, Wis., is planning to construct a one-story brick and steel foundry at Milwaukee.

McClellan & Junkersfeld, Inc., engineering and construction, has removed its home office from 45 William street to 68 Trinity Place, New York City.

The Ohio Brass Company, Mansfield, Ohio, recently bought about five acres of land and some buildings on a triangular plot just across the Pennsylvania Railroad tracks from its present Mansfield plant.

M. S. Hovey, vice-president in charge of manufacturing of **Fairbanks, Morse & Co.,** with headquarters at Chicago, has been appointed vice-president and general manager with the same headquarters.

The Ingot Iron Railway Products Company has been organized with offices at 1318 Peoples Gas Building, Chicago, for the development and promotion of the sale of Armco corrugated culverts in the railway field.

C. Garness, mechanical engineer of the American Car & Foundry Company, with headquarters at Chicago, has been appointed supervising engineer of railway car inspection of the **Robert W. Hunt Company,** with headquarters at Chicago.

The Paige & Jones Chemical Company, New York, has just completed an addition to its factory building at Hammond, Ind., and is installing considerable new machinery in order to take care of its rapidly increasing business in boiler feed water treatment.

Charles W. T. Stuart has resigned as foreman of car lighting of the Pennsylvania Railroad to become representative in the Philadelphia office of the **Safety Car Heating & Lighting Company.** Mr. Stuart was born in Philadelphia in 1888 and, after studying at the Engineering School of the Drexel Institute, entered the car lighting department of the Pennsylvania Railroad in 1909. At that time there were but a few electric lighted cars. Mr. Stuart has made a specialty of this particular branch of railway equipment ever since he became connected with the railroad. He has contributed largely to railway publications on car lighting subjects, including a series of articles in the Railway Electrical Engineer on the fundamental principles of car lighting. His largest contribution to car lighting literature is his recent book "Car Lighting by Electricity," which is the first complete volume covering this subject.

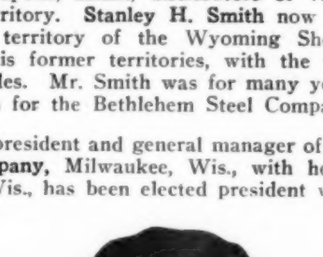
Chas. W. T. Stuart

The Inland Steel Company has changed the name of the Milwaukee Rolling Mill Company which it has recently purchased, to the Inland Steel Company of Wisconsin. **C. A. Irwin,** president of the Milwaukee Rolling Mill Company, will be president of the Inland Steel Company of Wisconsin.

Hugh B. Holmes is now located at 1711 First National Bank building, Pittsburgh, Pa., as a consulting engineer, specializing in reports on properties and projects. Mr. Holmes was chief engineer from 1913 to 1917 of the Kansas City, Mexico & Orient and then for three years was with Coverdale & Colpitts, consulting engineers, New York. He subsequently served from 1920 to 1923 as chief engineer of the Pittsburgh & West Virginia.

G. E. Geer, who has had charge for many years of the railroad sales of the **Wyoming Shovel Works** in its Chicago office, has resigned to become vice-president of the **William H. Ziegler Company,** Minneapolis, Minn., distributors of Wyoming shovels in that territory. **Stanley H. Smith** now has charge of the Chicago territory of the Wyoming Shovel Works, in addition to his former territories, with the title of director of railroad sales. Mr. Smith was for many years manager of railroad sales for the Bethlehem Steel Company.

Frank J. O'Brien, vice-president and general manager of the **Globe Steel Tubes Company,** Milwaukee, Wis., with headquarters at Milwaukee, Wis., has been elected president with the same headquarters, to succeed **Paul J. Kalman,** who has been elected chairman of the board of directors. **John W. Floto,** general manager of sales, with headquarters at Chicago, has been promoted to vice-president and general manager of sales with the same headquarters. Mr. O'Brien entered the employ of the Pullman Company in 1894 as a clerk and until 1906 held the positions of chief clerk to the general manager and assistant to the sales manager. On the latter date he resigned to become assistant to the president of the Qirvy Equipment Company, which position he held until June, 1910, when he entered the employ of the Globe Steel Tubes Company as sales manager with headquarters at Chicago. On April 6, 1917, he was promoted to works manager, with headquarters at Milwaukee, which position he held until June, 1918, when he was promoted to general manager, with the same headquarters. In February, 1920, he was promoted to vice-president and general manager with the same headquarters, which position he has held until his recent appointment.



Frank J. O'Brien

James M. Hopkins, chairman of the board of directors of the **Ryan Car Company,** Chicago, has been elected president, succeeding William M. Ryan, who has resigned, but who will remain as a director and retain his interest in the company. A new chairman of the board will not be elected at present. **T. H. Goodnow,** superintendent of the car department of the Chicago & North Western and vice-chairman of the Mechanical division of the American Railway Association, with headquarters at Chicago, has been elected first vice-president of the Ryan Car Company, with headquarters at Chicago.

The Kalman Steel Company, Chicago, manufacturer of reinforcing steel, has purchased the Corrugated Bar Company of Buffalo, manufacturer of steel re-inforcing bars. The plants of the Corrugated Bar Company are located at Hammond, Ind., Buffalo, N. Y., Boston, Mass., Philadelphia, Pa., and Atlanta, Ga. The offices of the Kalman Steel Company will be moved to the Wrigley Building, Chicago, on March 22. **Paul J. Kalman,** president of the Kalman Steel Company, will be president of the reorganized Kalman Steel Company. **George E. Routh, Jr.,** vice-president of the Kalman Steel Company, will be vice-president of the reorganized company. **J. A. Cathcart,** assistant vice-president of the Kalman Steel Company, and **A. E. Pinard,** treasurer of the Kalman Steel Company, will remain in those capacities. **A. P. Clark,** general manager of sales of the Corrugated Bar Company, has been elected general manager of sales for the Kalman Steel Company and **W. S. Thomson,** chief engineer of the Corru-

gated Bar Company, will have the same position with the Kalman Steel Company. **L. O. Helgensen,** eastern sales manager of the Kalman Steel Company, with headquarters at New York, will retain the same position.

The Inland Steel Company

The net profits of the Inland Steel Company for the year ending December 31, 1923, amounted to $5,274,959, after deducting depreciation, depletion, bond interest, federal taxes and employees' fund payments, as compared with $1,141,177 in 1922. The net earnings applicable to the common stock amounted to $4,749,959 or the equivalent of $4.01 a share on the no-par value shares outstanding, compared with 1.13 a share in 1922. Payments of dividends on the common stock amounted to $2,471,313, leaving $2,278,646 to be carried to the surplus account as compared with $127,168 last year. The company's bonded indebtedness was reduced from $4,731,000 to $728,000. There was an increase in the outstanding capital stock through the issuance of $10,000,000 of preferred and 1,182,799 shares of no-par value common stock in place of the 1,104,259 shares of common stock of $25 par value outstanding at the end of 1922. The decline in surplus from $18,332,614 to $16,799,893 is due to adjustments made at the time of the financing last year. The income account and balance sheet for the year 1923 are as follows:

Income Account	1923	1922
Net earnings from operations after deducting administration expense and all charges for repairs and maintenance	*$7,339,365	$2,434,023
Other income	274,043	.....
Total profit for year	$7,673,408	$2,434,023
Depreciation and Depletion	1,321,269	1,004,336
Interest on bonds	162,180	288,510
Estimated federal taxes	650,000	* .....
Payment to employees' fund	265,000	.....
Net profit for year	$5,274,959	$1,141,177
Preferred dividend	525,000	.....
Balance for common	$4,749,959	$1,141,177
Common dividends	2,471,313	1,014,009
Surplus for year	$2,278,646	$127,168

*Prior to 1923 federal taxes were deducted before showing net earnings.

Indicated Earnings	1923	1922
Earned on common	$4.01	$1.13

Balance Sheet	1923	1922
Assets		
Land, plants, mining properties, etc., after reserves	$38,936,386	$46,360,528
Investment and advance in affiliated companies	946,775	.....
Inventories	9,789,324	8,495,365
Accounts receivable	5,912,657	5,268,947
Bills receivable	195,806	146,945
U. S. Government securities	7,496,906	114,110
Other investments	55,248	* .....
Cash	4,248,506	1,357,732
Unexpired insurance	.....	24,600
Deferred charges	457,953	494,807
Total assets	$68,039,561	$62,263,034
Liabilities		
Common stock	‡$35,000,000	¶$25,356,475
Preferred stock	10,000,000	† .....
Bonded debt	728,000	4,731,000
Accounts payable	1,607,872	1,605,334
Accrued pay rolls	545,586	476,738
Accrued interest and taxes	1,112,214	394,921
Preferred dividend payable	175,000	.....
Operating and contingent reserves	2,070,995	11,365,952
Surplus December 31	16,799,893	18,332,614
Total liabilities	$68,039,561	$62,263,034
Net working capital	24,257,776	12,919,605

*Included in U. S. Government securities. †Only one class of stock prior to 1923. ‡1,182,799 shares of no par. ¶$25 par shares.

Obituary

George L. Mead, district manager of the Pawling & Harnishfeger Company, Milwaukee, Wis., with headquarters at Pittsburgh, Pa., died on January 24 from heart disease.

Frank Le Grand Townsend, treasurer of the Westinghouse International Company, died on February 1, in the Brooklyn (N. Y.) Hospital, at the age of 61. Mr. Townsend had served with the Westinghouse organization since his graduation from New York University in 1884.

Railway Construction

Atchison, Topeka & Santa Fe.—This company plans the construction of a storehouse at Dodge City, Kan., to cost approximately $65,000.

Atchison, Topeka & Santa Fe.—This company plans the construction of 16 miles of third track from Emporia, Kans., to Ellinor and six miles of third track from Emporia eastward.

Atchison, Topeka & Santa Fe.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of substructures for terminal facilities at San Bernardino, Cal., reported in the *Railway Age* of November 3.

Beaver, Meade & Englewood.—This company has been authorized by the Interstate Commerce Commission to construct an extension from Forgan to Hooker, Tex., 39.2 miles.

Chicago, Indianapolis & Louisville.—This company has awarded a contract to Thompson & Binger, Indianapolis, Ind., for the construction of a freight station at Indianapolis, reported in the *Railway Age* of January 5.

Chicago, Indianapolis & Louisville.—This company will elevate its tracks from East street to Alabama street in Indianapolis, Ind., this year at a cost of $150,000.

Chicago & North Western.—This company contemplates the relocation of its tracks through Whitefish Bay, Wis.

International-Great Northern.—This company will construct in 1924, a 1,200-car freight yard at Houston, Texas, and will increase the capacity of the Booth yard in that city. A roundhouse, to cost $150,000, will be constructed at San Antonio, Texas.

Long Island.—This company has applied to the New York Transit Commission for an order requiring the elimination of 22 grade crossings on its Atlantic avenue division between Flatbush Avenue Station, Brooklyn, and Jamaica, Queens, New York City. Under the law half of the expense would be borne by the railroad and one-fourth each by the municipality and state. There is now available $500,000 of state funds for this purpose—permitting work to cost $2,000,000, but the total cost of eliminating all the crossings is estimated by the Transit Commission at $11,000,000 if the railroad tracks are elevated or $40,000,000 if they are depressed.

Louisville & Nashville.—This company will construct with company forces a two-story office building and an enginehouse at New Orleans, La., at an estimated cost of $300,000.

Minarets & Western.—This company plans the construction of a one-story enginehouse and repair shop at Pinedale, Cal.

Minneapolis, Northfield & Southern.—This company is preparing plans for the construction of a seven-mile spur from Oxboro, Minn., to the Ford plant at South St. Paul, including a bridge over the Mississippi river, at an approximate cost of $750,000.

Minneapolis, St. Paul & Sault Ste. Marie.—This company will construct a 900-ft. extension to its ore dock at Ashland, Wis., at a cost of approximately $1,250,000. A contract has been awarded to Whitney Brothers Company, Duluth, Minn., for the erection of the sub-structure and bids for the erection of the superstructure will be taken within the next two or three weeks.

Missouri Pacific.—This company contemplates the construction of a union station at Texarkana, Ark. No plans for the building have yet been prepared.

Pacific Fruit Express.—This company contemplates the construction of car repair shops and a power house at Roseville, Cal., at an approximate cost of $150,000, including machinery.

Pennsylvania.—This company is reported as planning the construction of an office building and two freight houses at Cincinnati, Ohio.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*Lease of Grand Canyon Approved.*—The Interstate Commerce Commission has authorized the acquisition of control by lease of the Grand Canyon Railway, which the Santa Fe already controls by stock ownership.

CAROLINA, CLINCHFIELD & OHIO.—*Equipment Trusts Offered.*—Hornblower & Weeks are offering $1,518,000 equipment trust 6 per cent gold notes due $138,000 annually January 15, 1925, to 1935, inclusive, at price to yield 5.30 per cent to 5.70 per cent according to maturity.

CHICAGO GREAT WESTERN.—*Six Months Guaranty Certified.*—The Interstate Commerce Commission has issued a final certificate fixing the amount of this company's guaranty for the six months following the termination of federal control at $3,332,660, of which $22,660 was to be paid on the final certificate.

GRAND CANYON.—*Lease.*—See Atchison, Topeka & Santa Fe.

HOCKING VALLEY.—*Asks Authority to Issue Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell $6,000,000 of two-year 5 per cent secured gold notes due March 1, 1926, and to nominally issue and pledge as security therefor $7,500,000 of general mortgage gold bonds. It is expected to sell the notes to J. P. Morgan & Co., at 96.33.

ILLINOIS CENTRAL.—*Bonds Offered.*—Kuhn, Loeb & Co. have purchased from the Illinois Central, subject to the approval of the Interstate Commerce Commission, $11,604,000 Illinois Central and Chicago, St. Louis & New Orleans joint first refunding mortgage 5 per cent bonds, series "A," due December 1, 1963. The bonds are being offered at 94¼ per cent and interest to date of delivery to yield 5.35 per cent to maturity.

KANSAS CITY, MEXICO & ORIENT.—*Reorganization Contemplated.*—W. T. Kemper, receiver, has announced that the failure of this road to repay a government loan of $2,767,000 due December 1, 1923, makes reorganization of the company a probability. He denied reports that the sale of the road had been ordered and stated that operation will be continued. He declared that the Orient is now securing a satisfactory amount of traffic and that conditions are more promising than they have been for several years.

LEHIGH VALLEY COAL COMPANY.—*Bonds Sold.*—Drexel & Co. and the First National Bank, have sold $15,000,000 5 per cent first and refunding mortgage sinking fund gold bonds.

LEHIGH VALLEY.—*Coal Company Rights.*—The stockholders have been informed that the books of the company will close for subscription to coal company rights at 12 noon on March 15, 1924. After that date each stockholder will receive a warrant to subscribe to shares of the Lehigh Valley Coal Company at one dollar, in the ratio of one share for each one now held.

The directors have changed the final date for making subscriptions to coal company stock from April 15 to June 15, to permit investors abroad to make their subscriptions in time.

LEHIGH VALLEY HARBOR TERMINAL.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $10,000,000 of first mortgage 5 per cent bonds to be delivered at par to the Lehigh Valley in reimbursement of advances. The Lehigh Valley was also authorized to guarantee the bonds and to sell them at not less than 92½.

MARSHALL, ELYSIAN FIELDS & SOUTHEASTERN.—*Authorized to Operate Line.*—The Interstate Commerce Commission has issued a certificate authorizing this company to operate the line from Marshall to Elysian Fields, Tex., about 18 miles, formerly a part of the Marshall & East Texas.

MIDLAND.—*Receivership Terminated.*—The operation of this railway by the receiver, George M. Brinson, has been terminated and all the property, in various lots, has been sold to different parties. The court has appointed Thomas F. Walsh, an attorney at law, Savannah Bank & Trust Building, Savannah, Ga., as auditor to pass upon claims against the receiver and has allowed until March 1, 1924, for such claims to be filed with the auditor.

MISSOURI-KANSAS-TEXAS.—*Interest Payment.*—The executive committee has recommended to the board of directors the payment of interest at the rate of 5 per cent per annum for the six months ended December 31, 1923, on the adjustment mortgage bonds.

NEW YORK CENTRAL.—*Stock Issue.*—Vice-President A. H. Harris has issued the following statement regarding the company's stock offer, subscriptions for which closed January 31:

"The offer to stockholders of $26,823,737 additional New York Central stock has been entirely successful. The whole amount was subscribed for with the exception of a few hundred thousand dollars, representing for the most part the allotments of small and scattered holders."

With the new stock issued the outstanding total issue will closely approach $295,000,000, on which dividend requirements at the present seven dollar rate will approximate $20,650,000.

PENNSYLVANIA.—*Subsidiary Financing.*—See Philadelphia, Baltimore & Washington; also Pittsburgh, Youngstown & Ashtabula.

PHILADELPHIA, BALTIMORE & WASHINGTON.—*Bonds Sold.*—Kuhn, Loeb & Co. have purchased from the Pennsylvania Railroad Company and placed privately at 99, $10,000,000 Philadelphia, Baltimore & Washington general mortgage 5 per cent gold bonds, series "B," due February 1, 1974. The sale of these bonds is to reimburse the Pennsylvania for expenditures already made and in the payment of the Philadelphia, Baltimore & Washington's maturing obligations.

PITTSBURGH, YOUNGSTOWN & ASHTABULA.—*Bonds Sold.*—Kuhn, Loeb & Co. have purchased and sold privately $4,479,000 first general mortgage 5 per cent bonds, series "B," at 99. The bonds mature on February 1, 1962. The proceeds of this issue will be used to reimburse the Pennsylvania for expenditures made.

PERE MARQUETTE.—*Equipment Trusts Offered.*—A. B. Leach & Co. are offering $2,464,000 equipment trust 6 per cent gold notes, due $224,000 annually, January 15, 1925, to 1935, inclusive, at prices to yield 5.25 per cent to 5.70 per cent, according to maturity. These notes are stamped as being subordinate in lien to $4,928,000 unstamped prior lien notes. The total of stamped and unstamped notes outstanding is equivalent to less than 73 per cent of the original cost of the equipment, by which notes are secured.

ST. LOUIS SOUTHWESTERN.—*Equipment Trusts Offered.*—Harris, Forbes & Co. are offering at prices to yield from 4½ per cent to 5.20 per cent, according to maturity, $1,800,000 of 5½ per cent equipment trust certificates, issued under the Philadelphia plan. The certificates, dated March 1, 1924, mature in equal semi-annual installments of $60,000 from September 1, 1924, to March 1, 1939, both inclusive. Application has been made to the Interstate Commerce Commission for approval of this issue.

WABASH.—*Equipment Trusts Offered.*—The Equitable Trust Company and J. A. Sisto & Co. are offering $2,769,800 equipment trust 6 per cent gold notes, maturing annually $251,800 January 15, 1925, to January 15, 1935, inclusive, at prices to yield from 5.25 to 5.75 per cent, according to maturity.

Dividends Declared

Buffalo, Rochester & Pittsburgh.—Common, 2 per cent; preferred, 3 per cent; both payable February 15 to holders of record February 9.

Delaware & Hudson.—2¼ per cent, quarterly, payable March 20 to holders of record February 26.

New York, Chicago & St. Louis.—Common, 1½ per cent, quarterly; preferred, 1½ per cent, quarterly; both payable April 1 to holders of record February 15.

Pittsburgh & West Virginia.—Preferred, $1.50, quarterly, payable May 31, August 30, November 29 and February 28, 1925, to holders of record April 15, August 1, November 1 and February 2, 1925, respectively.

Trend of Railway Stock and Bond Prices

	Feb. 5.	Last Week	Last Year
Average price of 20 representative railway stocks	63.52	62.68	68.34
Average price of 20 representative railway bonds	84.35	84.16	85.50

Railway Officers

Executive

R. H. **Newcomb,** executive assistant of the Boston & Maine, with headquarters at Boston, Mass., has been appointed assistant to the vice-president of the New York, New Haven & Hartford, with the same headquarters.

Financial, Legal and Accounting

William H. Wilson, whose appointment as controller of the Norfolk & Western, with headquarters at Roanoke, Va., was announced in the *Railway Age* of January 12, page 220, was born on February 1, 1863, at Philadelphia, Pa., and was educated in the public schools of that city. He entered railway service for the first time on June 20, 1883, as a clerk in the service of the Norfolk & Western. In April, 1902, he was promoted to chief clerk and in February, 1907, Mr. Wilson was promoted to auditor of disbursements. In March, 1920, he was promoted to assistant controller, with headquarters at Roanoke, which position he was holding at the time of his recent promotion to controller. His entire railway service has been with the Norfolk & Western Railroad and its successor, the Norfolk & Western Railway.

W. H. Wilson

Operating

J. J. **Beacom,** trainmaster on the Chicago, Rock Island & Pacific, with headquarters at Estherville, Ia., has been transferred to Keokuk, Ia., succeeding F. L. Park, transferred.

J. A. **Jones,** superintendent of telegraph of the Southern, with headquarters at Charlotte, N. C., has been promoted to general superintendent of telegraph, with headquarters at Washington, D. C.

B. S. **Baumann** has been appointed assistant trainmaster of the Los Angeles division of the Southern Pacific, with headquarters at Indio, Cal., succeeding L. L. Laughlin, who has been assigned to other duties.

F. D. **Beale,** division engineer on the Chesapeake & Ohio with headquarters at Clifton Forge, Va., has been promoted to assistant trainmaster with headquarters at Strathmore, Va. A. M. **Davidson** has been appointed assistant trainmaster and supervisor of track with headquarters at Martin, Ky.

A. W. **Flanagan,** assistant superintendent of telegraph of the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to superintendent of telegraph, with the same headquarters, succeeding **E. Emtelman,** deceased. **W. R. Birt** has been appointed assistant superintendent of telegraph, with headquarters at San Francisco, succeeding Mr. Flanagan.

G. E. **Dornblaser,** superintendent of terminals of the St. Louis-San Francisco, at Tulsa, Okla., has been transferred to Memphis, Tenn., with jurisdiction over the Harvard and Yale yards. **E. E. McGuire,** superintendent of terminals at Monett, Mo., has been transferred to Tulsa, Okla., succeeding Mr. Dornblaser.

E. J. Lodge, chief dispatcher of the Colorado division of the Atchison, Topeka & Santa Fe, with headquarters at Pueblo, Colo., has been promoted to acting trainmaster of the Colorado division, with the same headquarters, succeeding **J. E. Agee,** who has been temporarily assigned to other duties.

R. L. Ruby, assistant superintendent of transportation of the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to superintendent of transportation, with the same headquarters, succeeding **G. F. Richardson,** who has retired. **T. B. Wilson** has been appointed supervisor of transportation, with headquarters at San Francisco, succeeding **A. J. Hancock,** whose promotion to assistant to the general manager was reported in the *Railway Age* of February 2. **J. C. Goodfellow,** acting assistant superintendent of the San Joaquin division, with headquarters at Bakersfield, Cal., has been appointed assistant superintendent of the San Joaquin division. **H. G. Thompson,** acting trainmaster of the San Joaquin division, with headquarters at Mojave, Cal., has been appointed trainmaster of the San Joaquin division.

E. H. Buhlman has been appointed superintendent of the Duluth and Superior division of the Minneapolis, St. Paul & Saulte Ste. Marie, with headquarters at Superior, Wis., succeeding **J. R. Michaels,** who has retired from active service. **W. H. Corbett,** trainmaster, with headquarters at Gladstone, Mich., has been promoted to acting superintendent of the Missouri River division, with headquarters at Bismarck, N. Dak., succeeding **S. W. Derrick,** who has been granted leave of absence. **M. J. Magoon** has been appointed acting trainmaster, with headquarters at Gladstone, Mich., succeeding Mr. Corbett. **F. D. Boyd** has been appointed trainmaster of the Chicago division, with jurisdiction over the second district, with headquarters at Fond du Lac, Wis. **A. A. Jones** has been appointed trainmaster of the Minnesota division, with jurisdiction over the third and fourth districts, with headquarters at Harvey, N. Dak. **E. D. Jones** has been appointed trainmaster of the Wisconsin and Peninsula division, with jurisdiction over the first, second and fifth districts, with headquarters at Shoreham, Minn.

Traffic

J. F. Hogan, general agent for the El Paso & Southwestern, with headquarters at Chicago, has been promoted to assistant traffic manager, with the same headquarters, a newly created position.

N. A. Black, chief tariff clerk of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kans., has been promoted to general agent, with headquarters at Santa Barbara, Cal., succeeding L. R. Everett, promoted.

R. C. Davidson has been appointed assistant general freight agent of the Chicago, Rock Island & Pacific, with headquarters at Chicago, succeeding G. E. White, whose promotion to general freight agent was reported in the *Railway Age* of January 12.

L. R. Everett, general agent for the Atchison, Topeka & Santa Fe, with headquarters at Santa Barbara, Cal., has been promoted to division freight and passenger agent, with headquarters at San Bernardino, Cal., succeeding W. R. Dowler, deceased.

Mechanical

R. H. Hale has been appointed master mechanic of the Alaska Railroad, with headquarters at Anchorage, Alaska, succeeding F. C. Ferrell, who has resigned.

L. A. Mitchell has been appointed master mechanic of the East Bay electric division of the Southern Pacific, with headquarters at West Alameda, Cal., succeeding **J. H. Lockett,** deceased.

E. J. Robertson, superintendent of the car department of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., has had his jurisdiction extended to cover the entire system.

T. H. **Goodnow,** superintendent of the car department of the Chicago & North Western, with headquarters at Chicago,

has resigned to become vice-president of the Ryan Car Company, Chicago, as noted in the Supply Trade News column.

A. G. Greenseth has been appointed master mechanic of the Minnesota division of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Enderlin, N. D., succeeding **S. N. Woodruff**, who has retired after 37 years of service with the company.

C. Y. Thomas, instructor of apprentices on the Atchison, Topeka & Santa Fe, with headquarters at Fort Madison, Ia., has been appointed supervisor of apprentices on the Kansas City Southern, with headquarters at Pittsburg, Kan., a newly created position.

A. J. Lewis, general master mechanic of the Missouri-Kansas-Texas of Texas, with headquarters at Denison, Tex., has been appointed master mechanic of the North Texas district, with the same headquarters and the position of general master mechanic has been abolished.

S. O. Taylor, chief mechanical inspector of the Mechanical division of the American Railway Association, with headquarters at Chicago, has been appointed master car builder of the Missouri Pacific, with headquarters at St. Louis, Mo., a newly created position. **William Martin** has been appointed general mechanical inspector, with headquarters at St. Louis, also a newly created position.

M. C. M. Hatch, assistant to the executive vice-president of the Missouri-Kansas-Texas, with headquarters at St. Louis, Mo., has been promoted to general mechanical superintendent, with headquarters at Dallas, Tex., with jurisdiction over the locomotive and car departments. **F. K. Tutt**, superintendent of motive power, with headquarters at Parsons, Kan., has resigned and his position has been abolished. **H. M. Warden**, superintendent of the reclamation plant at Parsons, has been promoted to superintendent of the locomotive department, with the same headquarters, a newly created position.

J. P. Downs, superintendent of shops of the Missouri Pacific at Sedalia, Mo., has been promoted to assistant mechanical superintendent, with headquarters at Little Rock, Ark., a newly created position. He will have jurisdiction over the St. Louis terminals (east side of river), the Illinois, the Missouri, the Arkansas, the Memphis, the Louisiana and the Central divisions. **W. G. Seibert**, general master mechanic, with headquarters at Kansas City, Mo., has been promoted to assistant mechanical superintendent, with the same headquarters, a newly created position. He will have jurisdiction over the St. Louis terminal (west side of river), the Eastern, the Joplin, the White River, the Kansas City terminal, the Omaha, the Northern Kansas, the Central Kansas, the Colorado, the Wichita and the Southern Kansas divisions. The position of general master mechanic of Kansas City has been abolished. **G. K. Stewart** has been appointed master mechanic of the Northern Kansas division, with headquarters at Atchison, Kans. **C. R. Kilbury** has been appointed master mechanic of the Southern Kansas division, with headquarters at Coffeyville, Kans., succeeding Mr. Stewart. **O. W. Judd** has been appointed master mechanic of the White River division, with headquarters at Crane, Mo. **H. W. Reinhardt** has been appointed master mechanic of the Missouri division, with headquarters at Poplar Bluff, Mo.

Engineering, Maintenance of Way, and Signaling

The title of **F. G. Jonah**, assistant to the president and chief engineer of the St. Louis-San Francisco, has been changed to chief engineer.

C. D. Pollock, office and designing engineer of the Alaska Railroad, with headquarters at Anchorage, Alaska, has also been appointed acting bridge engineer, succeeding F. H. Chapin, who has resigned.

F. H. Gilman has been appointed assistant engineer of the Southern division of the Northwestern Pacific, with headquarters at Sausalito, Cal. **A. F. Williams** has been appointed assistant engineer of the Northern division, with headquarters at Eureka, Cal.

E. F. Klutchar, engineer maintenance of way of the Illinois district of the Chicago, Burlington & Quincy, with headquarters at Galesburg, Ill., has resigned to enter the service of the Ingersoll-Rand Company.

E. E. Hart, chief engineer of the Nickel Plate district of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, has been appointed consulting engineer, with the same headquarters. **W. J. Bergen**, valuation engineer of the system, has been appointed chief engineer of the Nickel Plate district, with headquarters at Cleveland, Ohio, in addition to his duties as valuation engineer.

C. J. Geyer, division engineer on the Chesapeake & Ohio with headquarters at Richmond, Va., has been promoted to assistant superintendent maintenance of way with the same headquarters. **S. H. Pulliam**, formerly supervisor of track on the Baltimore & Ohio, has been appointed division engineer on the Chesapeake & Ohio to succeed Mr. Geyer. **G. E. Tebbetts**, formerly bridge engineer on the Kansas City Terminal, has been appointed general supervisor of bridges and buildings, a newly created position with system jurisdiction, with headquarters at Richmond. **Thomas H. Greene**, supervisor of track with headquarters at Russell, Ky., has been promoted to division engineer with headquarters at Clifton Forge, Va., succeeding **F. D. Beale**, promoted to assistant trainmaster as noted elsewhere. **Daniel Hubbard**, assistant engineer, has been promoted to division engineer with headquarters at Peru, Ind., succeeding H. A. Bertram assigned to other duties.

Purchasing and Stores

W. W. Morris, purchasing agent of the Northwestern region of the Pennsylvania, with headquarters at Chicago, and **C. E. Walsh**, assistant purchasing agent of the Central region, with headquarters at Pittsburgh, Pa., have been appointed assistant purchasing agents, with headquarters at Philadelphia, Pa. **W. G. Phelps**, purchasing agent of the Central region, with headquarters at Pittsburgh, Pa., has been appointed assistant purchasing agent, with the same headquarters. **A. E. Owen**, assistant to the purchasing agent of the Northwestern region, with headquarters at Chicago, has been promoted to assistant purchasing agent, with the same headquarters. **C. R. Peddle**, purchasing agent of the Southwestern region, with headquarters at St. Louis, Mo., has been appointed assistant purchasing agent, with the same headquarters. **G. W. Snyder**, general storekeeper of the Eastern region, with headquarters at Philadelphia, Pa., has been appointed assistant to the stores manager, with the same headquarters. **R. C. Harris**, general storekeeper of the Central region, with headquarters at Pittsburgh, has been transferred to Philadelphia, Pa. **O. V. Daniels**, assistant general storekeeper of the Eastern region and **S. I. Gowland**, assistant general storekeeper of the Central region, have been transferred to Philadelphia. **W. F. Vogt**, works storekeeper, with headquarters at Altoona, Pa., has been promoted to general storekeeper, with the same headquarters. **C. W. Kinnear**, general storekeeper of the Northwestern region, with headquarters at Chicago, and **W. L. Oswalt** have been appointed assistant general storekeepers, with headquarters at Altoona.

Obituary

W. A. Bowden, chief engineer, Department of Railways and Canals of Canada, died on February 3, at Ottawa.

Frank E. Kinsman, formerly well known in the railway signaling field, died at Leominster, Mass., on February 5, at the age of 72. He was the patentee of an automatic train stop and of a telephone switchboard.

Edward B. Whisler, freight claim agent of the Pittsburgh & Lake Erie, died on January 28, at his home in Pittsburgh, Pa. Mr. Whisler was born at New Brighton, Pa., and was connected with the Pittsburgh & Lake Erie for 32 years. In 1892 he began his railroad work as a clerk in the accounting department; in 1909 he was promoted to traveling auditor for the road. He was advanced to freight claim agent in 1913 and continued in this position until his death.